

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

GLEANINGS

IN BEE CULTURE

CONTENTS

MARKET QUOTATIONS.....	264
STRAWS, by Dr. Miller.....	271
PICKINGS, by Stenog.....	273
CONVERSATIONS WITH DOOLITTLE.....	274
EDITORIALS	275
Indoor vs. Outdoor Wintering	275
E. F. Phillips on Fertilization.....	275
Another Kink in Cutting Candied Honey	276
Heavy Winter Losses for Outdoor Bees.....	276
The Ohio Poul Brood Bill.....	276
Stings	276
Preventing Honey from Candyng.....	277
Objection to the Hoffman Frame.....	277
Wintering in the Machine-shop Cellar.....	277
Refreshing Fairness.....	277
GENERAL CORRESPONDENCE.....	278
The Shallow Hive and Frame.....	278
The G. B. Lewis Co.....	279
Vegetable Physiology.....	281
The Late Captain Hetherington	284
Indoor Winter Ventilation.....	284
Fertilization.....	285
HEADS OF GRAIN	287
Feeding Unfinished Sections Outdoors.....	287
Eggs in the Supers of Shallow Hives.....	287
A Handy Hive-carrier.....	288
Cutting Bee-trees.....	288
Bleaching Honey.....	288
Controlling Swarming.....	289
OUR HOMES.....	290
GARDENING.....	293
SPECIAL NOTICES.....	308

THE A. I.
C MEDINA



ROOT CO.
OHIO

U.S.A.

Eastern Edition.

ENTERED AT THE POSTOFFICE AT MEDINA, OHIO, AS SECOND-CLASS MATTER

OVER A
MILLION

Lewis' Perfect Sections.

5000 LBS

Dadant's Weed' Process
Foundation.

NOW IN STOCK.

All other supplies in proportion.
Discounts on early orders. Sixty-
eight-page catalog now ready. Send
us a list of the goods you want, and
we will tell you what they will cost.
We want to hear from you.

**LEWIS C. &
A. G. WOODMAN**
Grand Rapids, - Mich.

FOUR CARLOADS

NOW IN STORAGE
AWAITING YOUR ORDERS

Consisting of a full line of

STANDARD GOODS



Danzenbaker Hives,
Root's Dov'd Hives,
Root's Chaff Hives,
Hilton Chaff Hives,
Hilton T-Supers
Cowan Extractors,
Connell Smokers,
The Doolittle Wax-
extractors, and Al-
ley Traps, etc., etc.

As well as Weed Foundation, Section Boxes, Sec-
tion-presses, Enamel cloth, Brushes, Honey-
boards, Tin Rabbits, Taps for cutting-screw-
holes, and Manum Swarm-catchers.

Write for descriptive matter regarding Hilton
Chaff Hives and T-supers, with prices on the
number you think of purchasing.

36-PAGE CATALOG FREE

GEO. F. HILTON, Fremont, Mich.

Any man in Michigan
that keeps bees - one swarm
or five hundred, - is the man
we are looking for.

we
sell
the

Danz
Hive

Send for
booklet.

Are you that man?

Our catalog for the asking.

W. H. Hunt & Son.

Bell Branch, Mich.

we sell
Root's
Goods
in
Mich
i
gan

GLEANINGS IN A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS **BEE CULTURE** ILLUSTRATED SEMI-MONTHLY Published by THE A. R. CO. \$1.00 PER YEAR MEDINA, OHIO.

Vol. XXXII.

MAR. 15, 1904.

No. 6



PROF. BENTON seems to settle the matter of naming our bees, p. 232, and he is corroborated by Prof. Cook, who says in *American Bee Journal*, p. 165, "the correct name is *Apis mellifera*."

PHACELIA STRAW, according to a report in *Imker aus Boehmen*, was fed almost exclusively as winter food for cows by one man, and the cows gave a good yield of milk. But will American cows eat phacelia?

STENOG, I like your closing sentences about Dzierzon and Langstroth, page 222. The attempt to belittle Dzierzon brings up clearly in memory (A. I. will recall it) the attempt some forty years ago to show that Langstroth was not the inventor of the movable frame. Just as much as Langstroth deserves credit for the movable frame does Dzierzon deserve credit for the parthenogenesis theory, and it's a shame to try to strip him of his laurels when he's now up in his nineties. [See Pickings.—Ed.]

ARGENTINE REPUBLIC is reported in *L'Apiculteur* as a country where 150 to 250 kilos (330 to 550 pounds) of honey is the average yield per colony. I wonder—I wonder. [This does not seem so very wonderful when we take into consideration the average yield in some of the other tropical and semi-tropical countries. The yields that are secured in Cuba and some of the other islands of the West Indies would, I think, compare very favorably with these figures. When we remember that the seasons in these countries are much longer than ours, it is not difficult to believe.—Ed.]

THE REICHSVERBAND of Austria (it isn't as old as our National, but has more than 12 times as many members) has, without

aid from government, put up a pile of \$600,000 to defend any of its members who get into trouble about their bees, to make good any losses from foul brood, fire, theft, and some other things. This it has done by taking out a policy for ten years for that amount, equally divided among three insurance companies. [I give it up; but by taking the position of a doubting Thomas all along in this matter I forced you to bring out some facts that may take the conceit out of some of us American bee-keepers. If this information has ever before been given to the public through the American bee-papers, I have not seen it.—Ed.]

STIMULATIVE feeding often does more harm than good, exciting to flight in bad weather. In *Bienen-Vater* we are told it is because the bees fly out for water to thin the feed, and that, if we feed honey greatly diluted, giving at least half a pint at a time from above, bees will not fly out next day in bad weather. [There may be something in this, but not very much, I think. In the summer time, whenever the bees are fed it is always a rule for the fielders to rush out. So large a quantity of sweet coming in all at once gives them the impression that a large amount is available somewhere outside. At such times the going-out is not to get water but to find out where that sudden supply is coming from. If water were the object they would be going to the ponds, creeks, and watering-troughs; but these are all ignored by them. If we feed in early spring they will rush out just the same. But I will venture the assertion that it is never for water.—Ed.]

STINGLESS BEES. The colony of stingless bees sent last September from Brazil to the editor of *Bienen-Vater*, Vienna, Austria, in spite of warmed bricks and other means to keep it warm, expired early in January. Although stingless, the little vixens used savagely their powerful jaws in biting, and, instead of carrying out their dead whole, as our bees do, they first bit them in pieces. [You will, perhaps, recall that we had a colony of stingless bees some years ago. They were shipped from Mexico, and

we managed to keep them alive till cold weather set in. Our bees did not show a disposition to bite, probably because the colony was too weak when it reached here, and never fully recovered itself. But in Central America there are some varieties or species that bite so furiously and severely that the natives themselves insist that the bees sting.—ED.]

SORRY to learn that a paper package of honey ceases a life of usefulness at the next coming of warm weather, p. 219. A pretty heavy blow that at the paper-package business. [Perhaps I made the statement a little too strong. My purpose was to warn bee-keepers to be on the safe side; for it would be most unfortunate at this stage of proceedings to make a serious mistake and kill out entirely a new method of selling honey that now has a promise of a large future. I know this—that all candied honey, at the approach of warm weather, is liable to soften. Last summer I looked at our own package in paper. It had softened down like warm mush. The honey was oozing through the paper, and it already stuck to the shelf. When it was received from Mr. Aikin it was as hard and dry as a brick. I then looked into some jars of candied honey that were hermetically sealed, and found that they were also soft, but not so soft as the packages in paper. I simply wished to sound a note of warning so that those who are putting up honey in this form will be on their guard. It may be that some honeys would not soften up sufficiently to make trouble; but in any case let us err on the safe side. It would be good policy for all the bee-keepers who put up honey in this form to say to the retailer that they will take off his hands all that is left unsold by June, we will say, and will substitute an equal value of honey in some other form if so desired. The coming season will give us some positive information along these lines; for hundreds and hundreds of bee-keepers are putting up honey in this new form, and, strangely enough, consumers are taking to it very kindly. The very novelty of it attracts attention. They see it on the grocery shelves, ask questions about it, have a curiosity to try it; they like it; order more; and the beauty of it all is that, when our bottled liquid honey does candy, these very consumers will not be crying back, "Adulteration!"—ED.]

YOU'RE RIGHT, Mr. Editor, in thinking that the preference "in this locality" for covers just wide enough meant my own opinion; and until I read p. 175 I didn't know that others differed. My covers are just wide enough except some zinc ones that are made wider by a cleat on each side, which cleat, instead of being an actual benefit, is a damage, and I have pulled most of them off. I don't know of any reason why a cover other than a telescope should be any more than just wide enough. Do you? [Yes and no. Our customers say

that a cover that projects over the side of the hive allows the water to drop off without seeping back into the crack between the cover and the top edge of the side of the hive. But if the cover is propolized down, as it is in a great majority of cases, then the water can not seep through to do any damage; and, besides, propolis is as good as paint as a wood-preservative. We first made the covers just wide enough to span the width of the hive; but the trade would have none of that. They must be wider, or it would go to the people who make wider covers.—ED.]

GERSTUNG, editor of *Bienenzucht*, deprecates the idea of removing a queen in the honey harvest for the sake of freeing more bees to go afield. He thinks it has the opposite effect, actually delaying field work until their fair share of nursework is done. Admitting the advantage of shrinking the brood-nest when the forthcoming bees will have no more to do, he thinks the advantage more than offset by the decline of activity when the bees have no young brood, and by the lack of August-reared bees the following spring. His plan—which, after all, leaves the colony queenless, although not without the stimulating influence of unsealed brood—is this: Three or four weeks before the presumable end of the harvest, take a frame of brood with the queen and adhering bees, and make a nucleus. Ten days later, destroy queen cells and exchange a frame of sealed brood for a frame of young brood from the nucleus. A few hours before this exchange, kill the queen if it is desired to replace her, and give the nucleus a queen cell when exchanging brood. If the harvest holds, repeat the exchange of brood ten days later. When the supposed highest point of the harvest is reached, return the old queen, or the young queen in her place. I have practiced with satisfaction a somewhat similar plan, with two points of difference: The queen is removed as soon as and *not till* preparations for swarming are found, and the colony is not left queenless more than ten days.

YOU SAY, Mr. Editor, p. 219, that "propolizing at the points of contact between Hoffman frames in most localities is not a serious objection." You don't quite get my point. You called my attention to the metal frame-hanger that would help against the trouble of propolis with the Hoffman. My point was that, whether little or much trouble from propolis, the frame hanger didn't touch the most troublesome part. In a locality where propolizing the Hoffman "is not a serious objection," there would be no need of the frame hanger. In a gluy region the gluing between end-bars is ten times as bad as the gluing on the rabbet, and the metal hanger would leave nine-tenths of the trouble untouched, so the hanger wouldn't be worth while in either case. See? [And you do not quite get my point either. I will admit that propolizing between the lines of contact of the individ-

ual frames is much worse than at the point of support. I have not and do not now take issue with you there; but the point I was trying to make was that *metal* lines of contact would be much more easily separated, and to some extent less propolized, than the same form and shape entirely of *wood*. I still think that the metal-spaced Hoffman would work in your locality better than the regular Hoffman with wood projections. In any locality, a metal-spaced Hoffman that would separate more easily than the regular Hoffman would be appreciated. But there is another fact I did not bring out before. It sometimes happens that the wooden projections on the Hoffman split off when the propolis is dry and hard. That objection could not apply in the case of metal points of contact. There! do I make myself clear now?—Ed.]



They've chopped my automobile down,
And simply call it auto;
And now they've boiled the spelling down,
And give us just a '02

A French advertiser says, "Whoever will prove that my honey is bad for the health will receive two pounds free."


In the *British Bee Journal* the editor, Mr. Thos. Wm. Cowan, pays a touching tribute to the memory of Capt. J. E. Hetherington, whom he visited in 1887.

The eyes of European bee-keepers are so intently fixed on the United States that I find a good part of their literature is largely a discussion of our methods. That's a good idea on their part.

In a French exchange, *Progres Apicole*, a writer speaks highly of a smoker fuel made of cotton waste, such as is used for cleaning machinery. He makes a wad of it, like a link of sausage, rolling it together rather loosely, and just large enough so it will slip into the barrel easily. It burns slowly and for a long time. Two pounds of it can be made for a dime.

A friend wants to know what *garage* (p. 230) means. It comes from the French word *gare*, a railroad station, commonly called a "depot." The word is now applied to a place where automobiles are stored and repaired—a general rendezvous in cities for autoists. It is generally called *garrridge*,

to rhyme with *carriage*. It should be pronounced "gah-razh." The word has come to stay, being now anglicized.

A bee-keeper in Canada, writing to the *Australasian Bee Bulletin*, says he prevents robbing by piling three bricks thus  in front of the hive-entrance, the lower ones being just far enough apart to admit two bees at once. The bees are much averse to running into such long passage-ways, and soon conclude to get into safer business. We are not told how long the bricks are kept in that position.

Progres Apicole says the Bee-keepers' Society of the Aisne, France, is making use of illustrated postal cards to draw the attention of the public to the good quality of honey as a food. One picture now before me represents a little girl giving some honey to a boy younger than she is—evidently the baby. Under the picture are the words, "For our use we prefer, in place of common bonbons, honey, so pleasant, from the generous bees." It is certainly a good way to teach.

About a month ago a writer in the *British Bee Journal* made a vigorous protest against a certain firm advertising "honey without bees." The matter was referred to the company in question, and the point of their reply is contained in the following paragraph:

It seems to us quite natural that to bee-keepers the description, "Honey without Bees," would appear to be prejudicial to their industry, and consequently we are willing to refrain from advertising the product in this way from henceforth.

False statements in advertisements need looking after on this side of the ocean.

The *Australasian Bee-keeper* finds the following in a German bee-journal. It runs quite athwart American doctrine:

Brossard is a follower of Wygandt. He heats his bee house in winter; says he may warm his bees up to 86 degrees F. and not a bee will fly out, providing they have water given them. When I come to the apiary and find bees flying out when the weather is not suitable I know they have no water in the hive, and I must supply them.

From the same source I learn that Otto Schultz, one of the most voluminous bee-writers in the world, has this to say concerning the crystallizing of honey:

Take honey from combs that have not been sealed, and fill some glasses. Wait a few days or till the combs are sealed. Now extract, and with the product fill some more glasses. Seal these, also the others. Take another quantity of the same honey as last lot, heat it to not over 122 degrees F., allow it to cool, and fill another number of glasses. Seal them as the others, and label all of them. Store them in the same place. Lot No. 1 will crystallize first, lot No. 2 after a time; lot No. 3 will remain liquid a long time.

Gerstung, the editor, adds, "Crystallization will be deferred by stirring the honey occasionally." It seems to hasten it here.

In *Stray Straws* in this issue, Dr. Miller speaks a word in behalf of Dr. Dzierzon as the real discoverer of parthenogenesis, per-

haps fearing I meant to abate somewhat, in what I said in the previous issue, from the glory that belongs to the venerable man. Probably I should have interjected a little more of my own opinion, which, generally, I do not like to do. Whatever benefit that theory has been to the world is due exclusively to Dzierzon, for he alone discovered it so it would *stay* discovered. Columbus was no less the discoverer of America because he found men here who discovered it long before he did. His discovery consisted in discovering the globe itself, and in proving that it is round and can be circled; and so Dr. Dzierzon's theory involves results far more reaching than any thing the mere name implies.



PLANTING FOR BEES.

"Jones came over to talk with Doolittle this evening. Has Doolittle the time to spare?"

"Well, I had a little writing to do, but that can be laid aside for a time. What was it you wished to talk about, Mr. Jones?"

"Bee pasturage is getting scarce around where I live, or, rather, my bees have done very little for the past two years, and I thought the trouble was on account of a lack of pasturage, and I wanted to ask you what is the best kind of tree to plant for bees. I have been thinking of planting quite a few trees in the spring, if I can find out what will be best."

"In our northern locality there is no tree that gives as great a yield of honey as the basswood; and were I to set out any tree for honey alone, the basswood would be that tree. This tree is also very valuable for lumber; but, unless planted too closely to do the best for honey, lumber of little account could be gotten from it, on account of its growing so low and branching."

"I had thought of the basswood; then I had also thought that, if I could plant something that would give me fruit and the bees honey, it might be better. What about this?"

"For fruit and honey combined, there is probably nothing better than the apple. Some years, when the weather is just right during its blossoming, it will yield honey nearly if not quite equal to basswood as to quantity, but the quality is not equal to either clover or basswood."

"Apple blossoms quite early does it not?"

"Yes; and coming thus early is the reason that we seldom have good weather for the bees to work on it from start to finish;

but as it blossoms at a time of the year when a little stimulation in the shape of nectar from the fields is of the greatest value to the apiarist in populating his hives with brood, which will arrive on the stage of action just in time to take advantage of the honey-flow from white clover and basswood, it makes the honey which does come from it of double value. So if I were to plant trees for honey I would include the apple as one of the trees, as it possesses the advantages of giving a fairly good honey, giving said honey just at a time when it is of the greatest benefit to the apiarist, and gives, in addition, a kind of fruit that is desired almost universally."

"Is there any other tree you would plant?"

"I hardly think so; and, to be candid, I am not sure that I would plant any trees very largely for honey, having that as the main object, unless I were looking toward generations yet unborn; for there is little use of setting out any tree with the expectation of gaining any immediate benefit; and if set out for those who are to come after, in all probability the place would change occupants, or the occupants conclude that the land could be occupied more profitably with something else like cabbage, wheat, or potatoes, when, in either case, our labor in planting would have been mostly in vain, with people like you and me who are on the western slope of life."

"Well, I realize that what you say is quite true; but I think I will put a few basswood and apple trees in next spring. The apples may help me some unless I am called away too soon. I had also thought of sowing some seeds for the bees. What would be the best along this line?"

"White clover, alsike clover, buckwheat, sweet clover, rape, mustard, pleurisy-root, spider-plant, Chapman honey-plant, golden honey-plant, etc., in about the order named; but with the exception of the three first, I do not think I would sow any of them, only by way of experiment or as a source of amusement, unless there were waste places now growing up to foul weeds; for I do not think that it can be made to pay to occupy good tillable land with any kind of plant that gives nothing of special value except honey."

"Why?"

"Because it takes tens and scores of acres of any of these kinds of plants for the bees to gather enough nectar to store a surplus of any account therefrom. As hinted at, it may pay to sow all waste places with them, as such plants would take the place of burdocks, cocklebur, etc., which are a nuisance through the burrs and noxious weeds coming from them."

"Do you include sweet clover in these remarks?"

"As to sweet clover, with me I have failed to get it to grow on our muck and hardpan soil, and I have sown large quantities of seed on old fence-balks, by the roadside, on the edges of gulfs and ravines; in short,

have taken it in my pockets for years, when I went on hunting and fishing tramps, scattering it in places where nothing but noxious weeds ever occupied the ground, and, with the exception of places where the soil was of a sandy, gravelly nature, none of this seed has ever brought forth any but sickly plants, which would give up and die a year or two later."

"This is news to me, for I had been told that sweet clover was classed as a weed by the authorities."

"Yes, I know it is so classed; but the 'why' of such a course has always puzzled me, for here in York State it is far more easy to kill, even on the sandy and gravelly soils it will hold to, than any of the other kinds of clovers, none of it ever being seen in cultivated fields, while white and alsike clover persist in growing in fields and gardens, with a tenacity which is often very provoking, especially in beds of strawberries."

"Of the two clovers which you have mentioned, and the buckwheat, which would you prefer to sow?"

"Each and all of them, as each one has its place. But as all our farmers are familiar with, and often sow acres with them, I have always thought it best to encourage the farmers about me to sow these crops, for it is only where they grow by the hundreds of acres that much profit accrues to the bee-keeper."

"Do the farmers sow much white clover?"

"Not in this locality, for it is not necessary; for, after it once obtains a foothold, it propagates itself, and the farmers do not try to eradicate it, owing to its value in pasture land and for hay. Alsike clover does not hold to the land quite as well as the white; but as it is more valuable for hay than the white variety, it is so much desired that very many of our farmers sow it now, and the bee comes in for her share wherever sown."

"How about the buckwheat?"

"Of late years the price of that grain has been so good that the farmers need no coaxing to get them to sow it. At the close of the honey harvest from this source, if a few boxes of honey are handed out to those who sow the largest acreage of this grain, telling them that there is a sample of the honey that the bees secured while they were fertilizing the buckwheat flowers so that the good yield of grain they had obtained was the result, it brings about a good feeling, and causes a larger acreage to be sown the next year. Buckwheat in most localities is now a very paying crop for the grain it yields, while the honey from it finds a sale in market at remunerative prices, considering that it comes at a time of year when the bees are all built up strong of themselves, so that there is no need of stimulative feeding and coaxing, which is often required to get them in condition for the harvest of white clover coming early in the season."

"Well, I will be going now, and not hinder you from your writing longer."



FROM present indications the bees will have a favorable spring. It is generally known that it is more difficult to "spring" the bees than to winter them. Since the editorial notice elsewhere, regarding wintering, was written, we have received a few more reports that are very discouraging; but they are mainly confined to parts of Ohio, Michigan, and New York, and always to outdoor-wintered bees.

INDOOR VS. OUTDOOR WINTERING.

THIS winter will force to the attention of bee-keepers the question of whether or not they should winter indoors. Doolittle has always followed a very safe plan, putting half of his bees on summer stands, packed, and half in a cellar. If it is an extremely warm open winter, the outdoor bees will probably fare better. If it is very cold, and continues to be so, with a bad spring, the indoor bees will come out ahead.

Every bee-keeper should study his own locality, and then decide, by experiments which he may make, which will give him better results, year in and year out. A good house-cellar, darkened and shut off from the main cellar, will usually give very good results—enough so for one to make a comparative test between the indoor and outdoor plans.

E. F. PHILLIPS ON FERTILIZATION.

I DESIRE to call special attention to a very interesting article in this issue, by Mr. E. F. Phillips, of the University of Pennsylvania, the scientist who spent some time here at Medina working on the general subject of parthenogenesis. He had previously made a special study of the compound eye and several other portions of insect anatomy. At my request he has prepared a series of articles, the first of which is given in this issue. He has the special indorsement of Dr. Conklin, of the University, and his work has been viewed with much interest in scientific circles, more especially on account of the original work he is doing in unexplored fields. He recently read a paper before the Philadelphia Academy of Sciences. A representative of our company was present, and he reports that Mr. Phillips was plied with a great variety of questions, showing that the scientific men were greatly interested in the developments he laid before them.

In presenting these articles I have perfect confidence that Mr. Phillips has not given us hearsay evidence, but carefully digested thought-out science, based largely

on original work and investigation of his own. The queen-breeder may well read with care the series begun by him in this issue.

ANOTHER NEW EDITION OF THE A B C—THE 100TH THOUSAND IN THE PRESS.

THERE has been such an enormous run on our A B C of Bee Culture that the last 10,000, issued from the press about a year ago, is well nigh exhausted. We are hard at work upon a new edition, but the new books will not be ready until some time in September. We suggest that all dealers purchase no more copies than they can dispose of before then. In the meantime, many of our friends would prefer perhaps to wait for the new edition, which will have many additions. It will contain a large list of new honey-plants, and many of the articles will be entirely re-written to conform to the progress that has been made during the last few months. Take, for example, the subjects of "Candied Honey," "Extracted Honey," and "Queen-rearing." Many new facts have been developed, and these will be incorporated in new articles. Every year develops short cuts and new practices.

This new edition will reach the 100th thousand mark—certainly a large sale when we consider that there is scarcely one bee-keeper to a community.

ANOTHER KINK IN CUTTING CANDIED HONEY INTO BRICKS.

OUR Mr. Jesse Warren, spoken of in our last issue, who has been so successful in cutting candied honey up with a wire, page 224, has now gone one step further. He runs a current of electricity through the wire, heating it up to 110 or 120°. This greatly reduces the labor of cutting, and at the same time gives chunks that are mathematically true, and as smooth and clean as a piece of polished marble.

Everybody is delighted with our brick honey; and even in this town of Medina, where bee-keeping represents such large interests, residents have asked how it is that we can turn liquid honey into solid like this—not even supposing it to be candied honey, for, indeed, it doesn't look like that article. They have gotten the idea that by some process or preparation we take ordinary honey and solidify it. The old prejudice against granulated honey does not enter into consideration, because here is something that is not mushy nor mealy, but a smooth solid brick almost snow-white. The wrapping of transparent paraffine paper greatly enhances its appearance and selling quality.

THE OHIO FOUL-BROOD BILL HELD UP IN SENATE COMMITTEE.

THE bee-keepers of Ohio need to write to their Senators at once, urging the passage of the foul-brood bill which passed the House and is now in the committee of the Senate, where it looks as if there were a

disposition to hold it up. From some advices received we are fearful that a majority of the committee are not inclined to report the bill to the Senate at all. The Ohio bee-keepers should write to their Senators, Senate Chamber, Columbus, Ohio, at once, to see the members of the Agricultural Committee, and urge them to report on it at once. Delay is dangerous just now, when so many measures are on the calendar. Also write Senator R. W. Dunlap, Chairman of the Agricultural Committee, Senate Chamber, Columbus, O., urging the importance of the bill; that *your* interests will be jeopardized if the measure is not passed, etc.

PREVENTING HONEY FROM GRANULATING BY THE USE OF GLYCERINE.

OUR experiments have been going on as spoken of in a late issue. We put up a series of samples of alfalfa honey in paper bags. Some contained the clear honey; others one per cent, others two per cent, and others three per cent of glycerine. During very cold weather they all remained clear, as reported; but since the weather has moderated, alternately cool and warm, the samples without glycerine have candied. Those containing one per cent have granulated partly, while the two and three per cent mixtures have remained perfectly clear. Whether they will continue to do so remains to be seen.

As I have before pointed out, a mixture of glycerine could hardly be called adulteration, because this product is about ten times as expensive as ordinary honey. Naturally enough, if it were used at all it would be in small percents and for the purpose of preventing granulation—something that would be perfectly legitimate and proper. But there is one possible objection to the use of glycerine, in that it may slightly affect the flavor of the honey. If so, it will bar out its use.

STINGS—ARE THEY AN ACTUAL ASSET TO THE BEE KEEPER?

I WONDER how many bee-keepers there are who, if they could, would actually render it impossible for their bees to sting. I will admit there are days when one who has been stung pretty viciously wishes there were no such thing as stings in his business. It would be a great convenience to be able to open a hive without smoke, and without cautious deliberate movements; but is it not true that these same stings, which are sometimes an annoyance to us, serve the very useful purpose of protecting our property to an extent that more than offsets the inconvenience at times? As it is now, there is *comparatively* little trouble from thieves and mischievous boys, even when the bee-yards are located some distance from any dwelling.

And then here is another point of view: If our bees had no stings, is it not possible that everybody else would keep bees in his own back yard, the same as many persons keep chickens? If so, we should have more

competition and lower prices. There are persons who, if they were not deathly afraid of stings, would make hot competition. Would we remove the stings from our little defenders who give us bread and butter, rendering them perfectly helpless and harmless?

And after all, when we use a good smoker, and thoroughly understand the habits of our pets, are the stings an actual hindrance in getting a crop of honey? Is there any real excuse for getting stung more than four or five times a day? Indeed, is it not possible to work day after day without stings when one is properly clothed, veiled, and protected at the wrists? I remember I once worked every day in the yard for a period of nearly a month, without a single sting; but I had pure Italians of imported stock—the gentlest bees, in my mind, of any in the world.

ONE SERIOUS OBJECTION TO THE HOFFMAN OR ANY METAL-SPACED FRAME.

In my footnote to the last Straw in this issue I see I failed to cover one important point—namely, that *metal*-spaced Hoffman frames would be very objectionable to the extracted-honey man on account of the danger of dulling the keen edge of the uncapping-knife, unless it were held so carefully and operated so slowly as to increase very materially the expense of uncapping. The same thing applies to any of the metal-spaced frames, the Dr. Miller nail-spacer included. Indeed, I do not know of any extensive extracted-honey producers who find it practicable to use metal spacers, all because of their interference with the edge of the uncapping-knife.

Dr. Miller and a good many others say they are producers of comb honey; that they do no extracting, and therefore never use an extracting-knife; and they ask, with some show of reason, why they shouldn't use a frame that suits their convenience, even if it is objectionable to the other fellow.

HEAVY WINTER LOSSES REPORTED FOR OUTDOOR BEES; THE INDOOR BEES COMING OUT WELL.

In response to my request in our last issue, for reports as to how the bees were wintering, a large number of our friends have responded, so we are able to present a very good birdseye view of the situation all over the country except points west of the Rockies.

There will be heavy losses, just as I feared. A large number report from 50 to 75 per cent of the bees dead—some all dead. New York seems to have sustained the heaviest losses; then next in order I would place Michigan, Ohio, Pennsylvania, Indiana, Wisconsin, and the New England States. Illinois does not seem to have had very severe losses, although some bee-keepers have had a good many bees die. Iowa seems to show up well. In Missouri, and in most of the States west of the Mississippi

pi and east of the Rockies, the winter has been very favorable, and the bees are in prime condition. There have been some losses in West Virginia, but most of the other States south of the Ohio River will show good wintering.

But now let it be understood, the places where losses were very heavy seemed to be confined almost entirely to outdoor-wintered bees. I do not remember to have had a single report out of the large number received when there was bad wintering in cellars or repositories. A few bee-keepers in all the regions where losses have been extremely heavy report excellent wintering outdoors. Among the number is J. B. Hall, of Woodstock, Canada.

Whether these losses will affect the clover market next summer remains to be seen.

Since the first of March the weather has moderated very materially over the country—just enough to give occasional flights in warm localities, but cool enough to prevent brood-rearing going on to any extent.

WINTERING IN THE MACHINE-SHOP CELLAR; IMPORTANCE OF VENTILATION.

SOME question has been raised whether it is advisable or desirable to ventilate a bee-cellar at night during moderate or muggy weather, closing the doors in the morning. We have been pursuing that very policy with our bees wintered in the machine-shop basement. And what are the results to-day? Appearances indicate that the bees are coming out in fine condition. The dead ones on the cellar bottom can almost be counted, so few are they. The clusters are quiet, clean, and healthy, and contentment reigns supreme, notwithstanding the temperature outside to-day is about 50. We have tried this over and over; and if we do not ventilate during warm spells they become uneasy.

Can it be we are mistaken in this belief that ventilation is an important factor in cellaring bees? I can hardly see how it is possible. The results, after several winters, are so gratifying that I am rather inclined to the opinion that we shall winter indoors exclusively in the future. So quiet have the bees been this winter it has not been necessary so far to carry them out and give them a flight, and return them, as we did last year.

I might say in this connection, if one finds his bees uneasy, and can do so, let him carry them out on a warm day when they can fly, and take them back at night.

I can only regret that we did not have all of our bees in the cellar this winter. If we had done so, I imagine we should have had stronger and better colonies. We expect to keep our bees indoors for a month yet.

REFRESHING FAIRNESS.

A SHORT time ago the great paper, the Chicago *Inter-ocean*, in one of its weekly editions published a statement to the effect

that a great deal of comb honey in the market was manufactured. A protest was made by Mr. G. W. York, President of the Chicago Bee-keepers' Association, and also by our Mr. A. I. Root. The latter called attention to the fact that he had had for years a standing offer of \$1000 for a single pound of manufactured comb honey, without a taker; that the Department of Agriculture through its apiculturist, Prof. Frank Benton, had repeatedly denied statements of this kind. The publishers wrote a very nice letter, acknowledging the receipt of the correction, sending a copy of their paper, giving the letter of A. I. Root in full. In the letter received the editor said he was guided by an old farmer of experience, who believed that manufactured comb honey was on the market; but in accordance with a rule of the *Inter-ocean*, long since in force, to be fair to all parties, he thought it but proper to make the correction.

Prompt denials, couched in courteous language, will go a great way in nullifying the damage made by these false statements. Whenever statements of this kind appear they should be promptly answered.



THE SHALLOW HIVE AND FRAME.

Objections to Such Hives Not Due to the System but to Faulty Construction; Their Advantages.

BY J. E. HAND.

I notice on page 24 you ask for reports from those who have tried the shallow sectional-brood-chamber hives. I have used such hives for the past fifteen years in the successful production of comb honey. At the present time I have 130 in use. I am a firm believer in the great superiority of the shallow frame, and the *very* shallow frame. A frame six or seven inches deep is too deep for the best results in my location. One reason is that they do not admit of that extreme contraction which forces all the white honey into the sections; and another reason is that the queen is not inclined to pass so readily from one section to another in so deep a frame. The frame I use and prefer is $4\frac{1}{2} \times 17\frac{1}{2}$, outside measure. Brood-chambers and supers are alike and interchangeable. Wide frames and fences are used in the supers, with full sheets of foundation in the sections, and only inch strips of foundation in brood-frames.

I have proven to my entire satisfaction, by a comparison of shallow and deep frames used side by side for the past fifteen years,

that the very shallow frames not only winter better, and build up faster in spring, but they will produce more bees to the square inch than any deep-frame hive; and by their extreme contraction the bees are compelled to put all the honey in the sections.

I believe most of the objections to these hives have been due to the improper construction of the same, and not to the system itself.

I am well aware that these hives would not be best for the careless bee-keeper; but for the practical honey-producer who will take advantage of the principles for which these hives are especially constructed they stand without an equal. Especially is this true in the production of comb honey where the honey-flow is short and sharp, or rather poor.

The use of these hives practically does away with all handling of frames, enabling the honey-producer to handle more bees and to produce more honey. I clip all my queens, cut out queen-cells, and perform all necessary work, without removing a single frame. I have no time to handle frames or dummies, followers or wedges. The proper manipulation of these shallow brood-chambers at the right time will practically prevent swarming.

Should there be any swarms they are hived in a single section of shallow brood-frames, with plenty of section room for the largest swarm, and practically all the honey will go into the sections, not next week, but right now. These hives are in pairs; and as soon as the surplus is removed they are united by simply placing one on top of the other. This gives plenty of workers for any fall honey that may come, and rarely has to be fed for winter.

A frame of dry comb should be placed in these contracted hives to prevent pollen in sections, and a queen-excluding honey-board will prevent brood in sections. I have no trouble along these lines. In hiving swarms in these contracted brood-chambers an empty section should be placed underneath for a few days to prevent swarming out, as they are liable to do if given only one section at first.

By expanding these hives to the fullest capacity of the queen, up to the honey-flow, a large force of workers is produced; and by extreme contraction at the beginning of the honey-flow all the honey is forced into the sections.

Expansion and contraction are the prime factors of successful comb-honey production in my location, which is a very poor one.

Birmingham, O.

[Along in the early 80's, about the time I first took charge of the bee department of this journal, the subject of sectional brood-chambers (or, as some called them, shallow hives) was discussed pro and con. Many of the arguments that you advance in favor of them were advocated then. So far as I know, all or nearly all who used the

shallow hives years ago are still users of them, and believe they are labor and time savers. But there is a conflict of opinion as to how deep the brood-nest should be, and how the frames should be adjusted in the hive—whether with closed ends or open ends; whether with closed ends *close-fitting* or closed ends *loose-fitting*.—Ed.]

THE G. B. LEWIS CO.

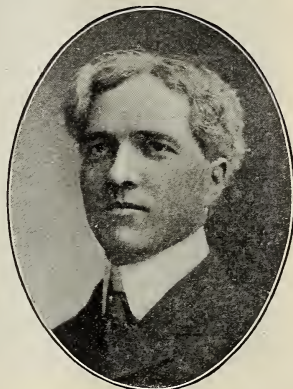
President and Interior Factory Views.

The following write-up with the illustrations of the G. B. Lewis Co.'s manufacturing plant appeared in the *American Bee Journal* for Feb. 18. We take pleasure in presenting the same in our own columns, not because we are interested in their business financially (for we are not), but because we are always glad to recognize an honorable and fair competitor who is hustling for business everywhere.

After the traveler, bound for St. Paul, leaves Milwaukee he sinks back in his comfortable seat bidding farewell to all signs of activity until he shall reach his destination in the morning. As he leaves Watertown Station and crosses the Rock River, he sees on its banks a large building lighted up by thousands of electric lights, with smoke issuing in dense volumes from its chimneys. He hears a mighty rumble of machinery above the rush of the train, and in an instant he is past. This great building which the traveler has seen but for a moment, with a large warehouse, office-building, and three immense lumber-yards near by, comprise the bee-hive plant of the G. B. Lewis Co., one of the two largest in the world, given over to the

exclusive manufacture of bee-keepers' supplies, known far and wide to the honey-producing population of this country, Europe, and the entire world, and yet never heard of by many at their own door, who are still strangers to the busy bee.

Five floors compose the main factory. A miniature railroad runs into the ground floor, transporting the lumber in its early stages from the yards to the planners. In this department the wood is partially prepared, being planed for hives, polished for sections,



GEO. C. LEWIS, PRESIDENT.

and by means of an electric elevator is carried to the floors above, where operations are completed later on.

On the next floor below is found the iron-working department where the boring is done, saws are kept in shape by help hired for this purpose alone, and where special machines are constructed.

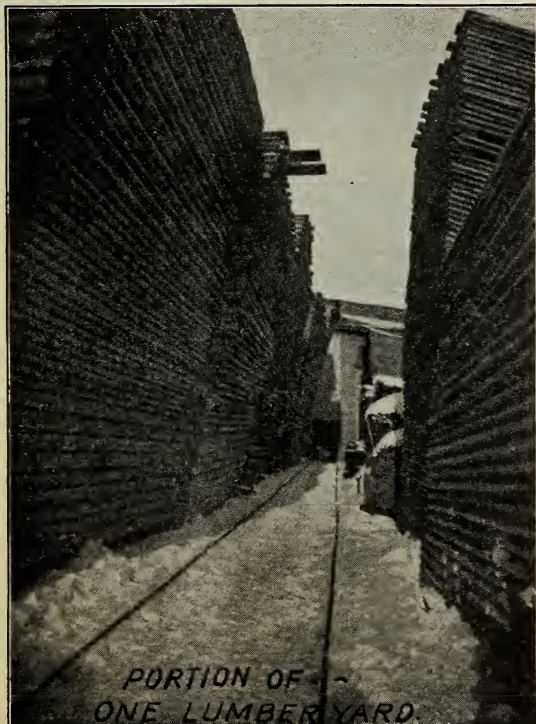
On the third floor is found the bee hive department, where hundreds of saws sing from early morning till late at night. Here the hive parts are made.

On the next floor above, the long basswood strips are sawed into correct lengths, and girls seated at benches sort these into different grades. The sections are also manufactured, crated, and marked here, and finally sent down a long chute to wagons below, where they are put into storage or loaded on trains. In this portion of the factory are also made the woven wood and wire boxes in which bee-supplies are packed. This method of packing has characterized the Lewis shipments for years.

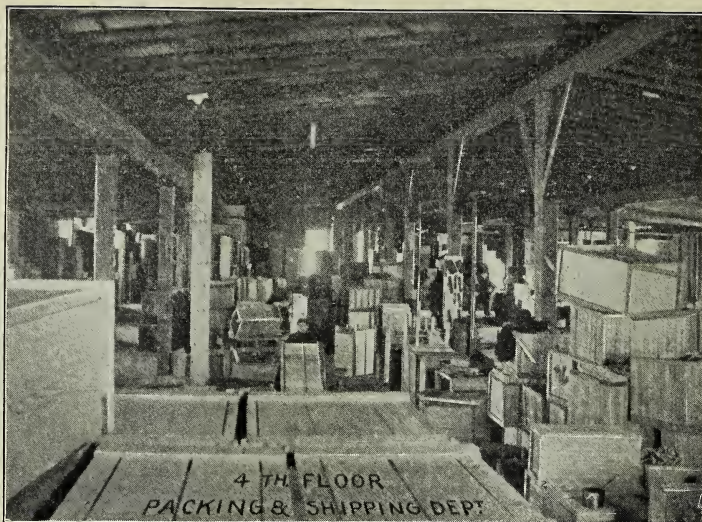
The fifth and top floor is given up exclusively to the packing department, 20 000 square feet of floor being used for this purpose. On this floor is also found the library of the G. B. Lewis Co., where every book known to the bee student is for sale. Here comb foundation by the ton is packed into neat boxes, ready for shipment, and every other device that the bee-keepers can possibly want is on hand in large quantities.

This large industry did not spring up in a night. It represents the efforts, the study, the labor, and the persistence of over a quarter of a century. Thirty years ago the late Mr. G. B. Lewis, then a young man, engaged with his brother, Robert E. Lewis, in the business of making sash, doors, and blinds. In those days bee-keeping was not a specialty. A farmer here and there kept bees, and made, after a homely fashion, his own hives and other appliances. Occasionally one would come to the shop of the Lewis Bros. and have a few hives made, and from this small acorn of crude carpentry grew the mighty oak of perfection in the machine-made bee-supplies turned out by the Lewis Company to-day.

In 1878, Mr. Chas. E. Parks came into the business. Mr. Robert Lewis having retired eight years before. In 1890 the business was incorporated, and ever since



PORTION OF
ONE LUMBER YARD.



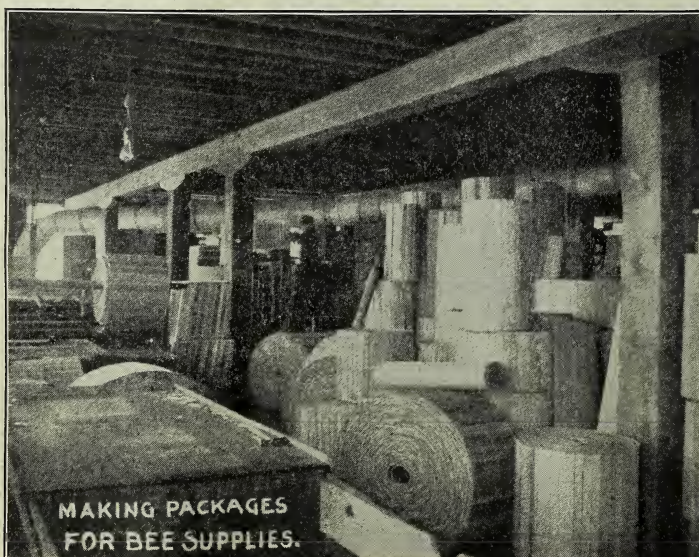
has been known as the G. B. Lewis Company. Mr. Parks proved a most valuable acquisition to the firm, and remained actively interested until his death, in 1895. He was a man of great ambition, a mechanic of the highest type, and by his inventive genius greatly improved the methods of manufacture. He was also the originator of many new machines, and finally invented what is now the well-known Parks patent woven-wood and wire shipping and packing box. Owing to his successful efforts in this latter venture, he was sought by promoters throughout the United States, as well as England and France.

The plant is situated in the garden-spot of Wisconsin. Surrounded by nature in its most beautiful form it rests—peaceful without, though most active within—on the west shore of the river, and, with its tall smoke-stack and piles upon piles of lumber, presents a most picturesque sight. Adjacent to the factory the beautiful Rock River dam rushes and rumbles in summer-time to the aid of the great engine, until its rum-

ble, growing fainter and fainter, loses itself in the distant fields beyond where it mingles with the hum of the bees that profit by its toil. Conveniently located is this large industry, easily accessible to the lumber regions of Northern Wisconsin and Minnesota. In the year 1903, 800 cars of basswood, elm, poplar, and pine were shipped into Watertown and switched on to the G. B. Lewis Company's private tracks. To the average layman this seems enough wood to supply sufficiently the bee-keepers of a continent.

To arrive approximately at the business that is done by this company in a fair season, the following facts covering the year just past may be of interest: 50 car-load orders alone, and 10,000 smaller orders as well were entered and shipped; 10 tons of comb foundation, thousands of hives, and 15,000,000 sections were sold. The sections alone, if placed unfolded in a straight line, would more than reach from Chicago to San Francisco.

This concern now occupies in the business world a





prominence envied by many, and enjoys a reputation justly earned. Its success is largely due to the modern and liberal methods employed by its officers, who exemplify the old adage, that "Liberality begets liberalty." At the helm of this institution is found Mr. George C. Lewis, its president, who has had the active management of the business for years. Mr. Lewis, whose portrait appears in this issue, is the son of the late G. B. Lewis. He is a young man of rare business sagacity, energetic, of high integrity, and thoroughly alive to the best interests of his company and its customers. George C. Lewis is well known, and occupies a position of prominence among the leading manufacturers of bee supplies.

The Lewis Company gives employment to over 100 people, and now, while the flowers and buds have not yet arrived, and the bees are still sleeping, and the ground is covered with snow, all hands are working, toiling, sweating. Day and night must they labor, office and factory alike, and voices are even now heard

calling, loudest of all the jobber, the wholesaler next, and even the murmur of the bee-keeper himself is heard in the distance, increasing as spring approaches until it drowns out the noise of his swarming bees.

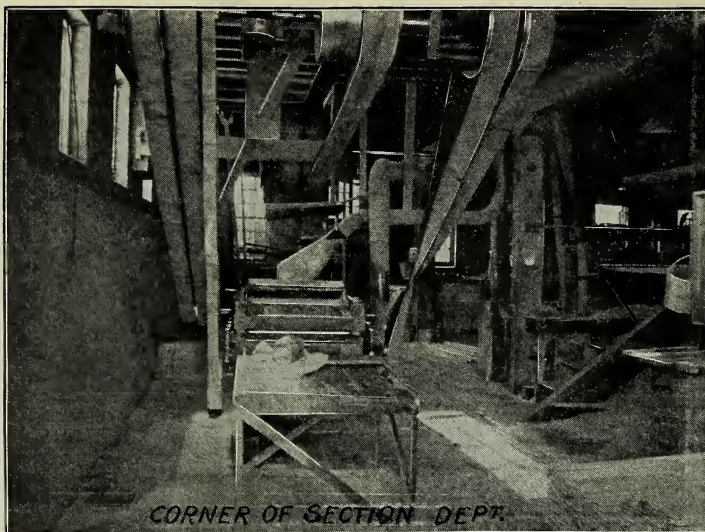
Having been in this hive of industry, we can personally testify to its greatness and superior qualities in every way. G. B. Lewis are, and have been for years, among our regular advertisers. Their goods and honorable dealing testify to their popularity as well as reliability.

VEGETABLE PHYSIOLOGY.

BY PROF. A. J. COOK.

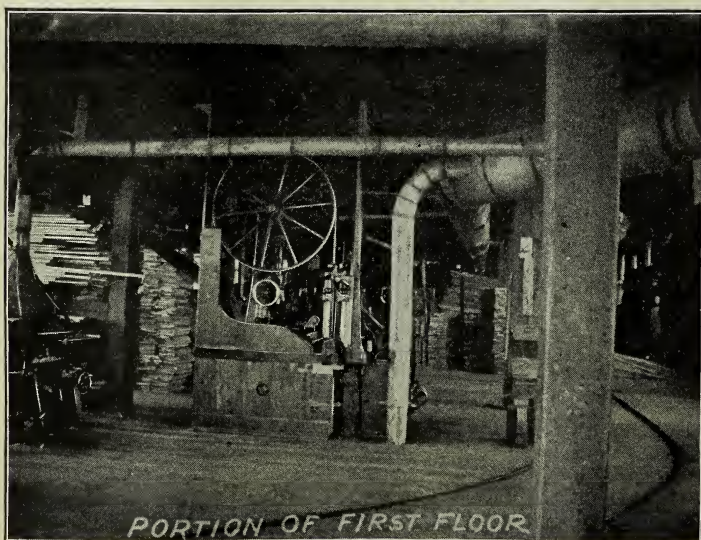
I was much interested in the article on vegetable physiology, GLEANINGS for Jan. 15. While I recognize the fact that nega-





tive testimony is never to be regarded as very conclusive, yet I have such a preponderance of such in this matter of nectar secretion by plants outside of floral or extrafloral glands that I must express much doubt in the matter. I have been looking intently now for many years to gain evidence that plants secrete nectar over the general surface of either twigs or leaves. I have never seen any such evidence. I believe the fungus ergot does secrete nectar. If so, it contradicts the statement made in the article that chlorophyll is necessary to the formation of nectar. Ergot is one of the fungi, and has no chlorophyll in its cells. I

am quite of the opinion that all nectar secretion by plants is either in the flowers or from nectar-glands outside, as seen so well in the partridge pea and even in the cottonplant. In all other cases, so far as I have observed, the so-called honey-dew comes from insects. The late Mr. Meahan and I had a warm discussion some years ago on this subject. He contended that the honey-dew came from the general surface of the plants, and was a product of them. I urged the proposition that it was secreted by either aphids or coccids. I besought Mr. Meahan to send me specimens, which he was kind enough to do. The specimens

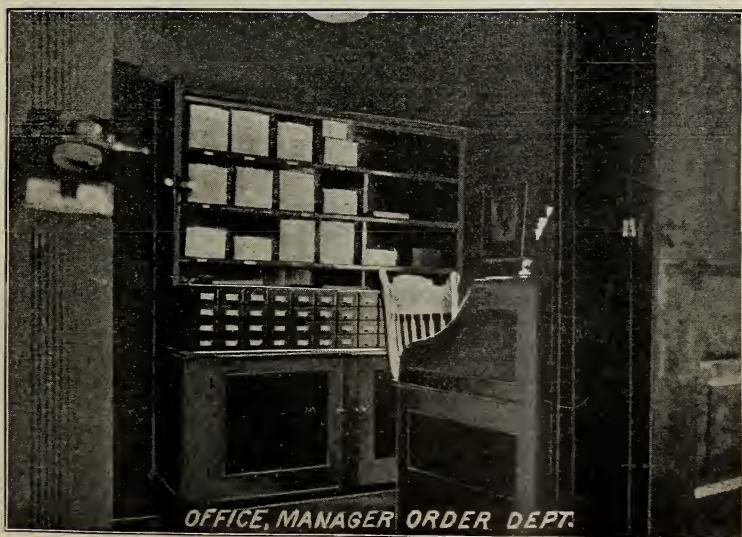




were pine twigs from Oregon, and these were heavily coated with solid incrustations of sugar. I was much pleased on examining them to find very strong circumstantial evidence, almost as good as finding a fish in milk. This evidence consisted in the finding of the cast skins of aphids scattered among the sugar deposits. I think Mr. M. was convinced, as he dropped the discussion at once and never took it up again.

In visiting Clouds' Rest, one of the highest peaks in the Yosemite region, we found magnificent pines crowning the lofty summit. It was about midday as we passed under these great trees. As we looked up through the foliage, great drops of delicious honey-dew were almost multitudinous. So

plenteous was this that it was easy for us to get enough for thoroughly sampling the nectar. The ground beneath was thickly strewn with the same liquid sweet. At first the lower branches which we could reach from our horses showed no insects, though the honey-dew was very plenteous. A closer search, however, soon found the numerous plant-lice, the source of this abundant honey-dew. I saw no bees at all, and wished that I might have an apiary there to glean this nectar, which was bound to shine unseen and waste its fragrance on the mountain air. If any reader of GLEANINGS ever finds undoubted honey-dew as a product of vegetation I should be very thankful to receive specimens.

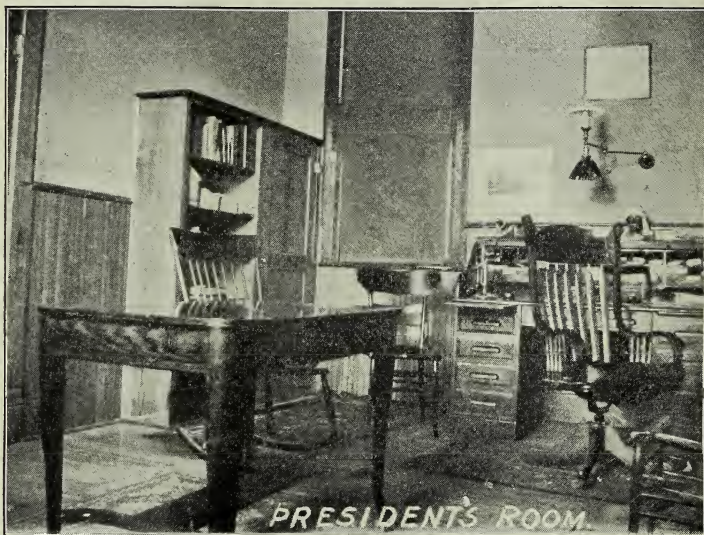


[THE LATE CAPTAIN HETHERINGTON.

I was very much pained to read in the *American Bee Journal* and GLEANINGS of the death of this prince of bee keepers. I think we may well say that he stood at the head. He was, indeed, a great man, and I feel richer for having known him. I met him several times, and especially at his brother's, in East Saginaw. I knew his brother even better than I knew him. These men were remarkable for their ability, for their neatness and system, for their inventive genius, and, best of all, for their clean character. They were also very modest men. One had to know them long and well to appreciate their beautiful manly characters. I have rarely known men whom I loved and respected more. Surely American apiculture has met a great loss. Claremont, Cal.

grees there is a theoretical point of temperature at which, if the cluster could be kept, the bees would be dormant, requiring neither food nor air. In actual practice that point of temperature may never be maintained, but it can be approximated. One trouble is that the center of the cluster will differ from the outer part.

If the surrounding atmosphere be kept at 50, any slight motion of the bees will run the center of the cluster above 50, inciting to more motion; hence more food, more air. Experience seems to show that, if the surrounding atmosphere be held at a point somewhere about 45 degrees, very little food and air will be needed to bring the cluster up to 50, and only enough will be consumed to hold it at that point. (Please understand that I don't say that 50 is the exact point of greatest quietude; I don't



INDOOR WINTER VENTILATION.

A Few Broad Principles that will Assist One to Solve some of the Conflicting Opinions.

BY DR. C. C. MILLER.

A correspondent who has kept bees most of the time for 65 years, is familiar with the bee-books and bee-journals of the day, and, being a careful observer, has learned many things about bees, confesses himself all at sea with regard to the subject of "winter ventilation." I don't wonder. One says upward ventilation, another says covers hermetically sealed; one says this, another says that.

Let us begin at the beginning and see if we can reconcile some of the apparently conflicting views. Bees consume food to produce heat or motion. The food is fuel, and there must be air to burn the fuel. Somewhere in the neighborhood of 50 de-

gree know what it is; but let us call it 50 for short.) That is, less will be required to bring up the necessary heat if the temperature be a little too low than to support the motion if the temperature be a little too high.

With the foregoing as a basis, we are ready to consider some points as to the air supply. There must always be a sufficient amount of air to balance the food consumed, otherwise there will be suffocation. There may be too little air; there can not be too much if it be of the right temperature, for the bees will consume no more than they need.

In the cellar we can, to a certain extent, control the temperature surrounding the hives; and if the air in the cellar be pure, and approximately of the right temperature, our chief care will be to see that enough air is introduced into each hive. There is no fear of too much; neither does it matter how

it be introduced, if only there be enough. If the bottom be sufficiently open, the top may be hermetically sealed; if the top be sufficiently open, the bottom may be hermetically sealed. My first cellar wintering was with box hives; and, following the lead of Quinby, I turned them upside down, making them hermetically sealed at bottom and entirely open at top. To-day my hives in the cellar are sealed at top, and pretty wide open at bottom—a two-inch space under bottom-bars with entrance two by twelve inches. A much smaller opening will answer if there be an opening above and below, as in the case of a comparatively small entrance below with a crack above, the cover being held up by a nail laid flat under it.

Outdoors we can not control the temperature of the surrounding air, and must meet conditions as well as we can. In a severe climate measures must be taken to make the hive warm, so as to lessen the demand on the bees for keeping up the heat. The change of air in the hive is, in general, caused by the fact that the warmer air in the hive is lighter than the outer air. In a mild climate with no strong winds, a large entrance at bottom, with every thing else closed, may do almost as well as in the cellar. In a cold climate, such free entrance would allow more air than needed, the extra amount only causing more consumption with its attendant ills. In a perfectly still atmosphere this would not be so bad; but let a strong wind prevail and the rapid cooling would make too great a demand on the bees. A hedge or fence may protect against these winds, and the matter may be helped in another way—contract the entrance below and leave a small crack above. With a crack above, an entrance of two square inches would allow as much change of air under most circumstances, during a perfect calm, as an entrance of twenty inches without the crack above; while a strong wind would have comparatively little effect upon the two-inch entrance as compared with its effect on the twenty-inch entrance. The point is, that the small entrance below with the crack above produces a constant passage of air that can never be great at any one time, and reduces the ill effects of a strong wind to a minimum.

A cushion of chaff or other absorbent materials, as they are called, over the brood-nest, is supposed to allow the air to pass through all its parts slowly, although experiments across the water seem to show that the benefit comes from the non conducting cushion retaining the heat, the air not passing through the cushion but through the cracks at the edges of the cushion.

One advantage of the cushion overhead is that it keeps relatively warm, and so the moisture from the bees does not congeal upon it and fall in chilling drops upon the cluster.

I resist the temptation to enter at length upon giving the *why* of the conflicting opinions of those who are equally successful with apparently opposite plans, or unequal-

ly successful with precisely the same plans. A careful application of the principles here given will probably help to solve most of such problems.

For example, my correspondent says that, for many years, he wintered without the loss of a colony that had enough honey with every thing sealed above, and an entrance of one and a half square inches, adding: "And I was in a zero country, too, where the mercury occasionally went down to 20 degrees below zero, and was frequently below zero for several days in succession. Now I am told by bee-men, bee-books, and bee-papers, that there must be 'upward ventilation.' Can you tell me how this is? what upward ventilation is? and how it can be had without an 'upward draft of air,' which is forbidden?" And, although he does not say so, I suspect that he finds that the plan that worked so well in a colder climate will not work so well in the warmer climate of Southern Missouri.

As already explained, the change of air in the hive is caused by the difference of temperature inside and outside the hive; the greater that difference, the more rapid the change. In his former location the cold was so great that a one-and-a-half-inch entrance changed the air as rapidly as the bees used it: where he is now, the bees will suffer without a larger entrance unless the change be aided by a crack above.

"Upward ventilation," as the term is generally used, means the passage of air through the hive by means of a small opening or openings above. It can *not* be had without an "upward draft of air." He who says an upward draft of air is forbidden, probably means that there must be no upward passage of the air more rapid than needed by the bees.

Marengo, Ill.

[I take it, doctor, that you are a firm believer in ventilation of some form in the cellar. Some of our leading successful bee-keepers, however, have argued for almost no ventilation. As Mr. A. C. Miller pointed out some little time ago, probably some of these non-ventilator winter-repositories were constructed in such a way that a large amount of air would percolate through the sides enough to maintain the necessary quiet in the hives.—ED.]

FERTILIZATION.

A Hint to Queen-breeders; an Interesting Article.

BY E. F. PHILLIPS.

In works on apiculture and in bee-journals we continually see the word "fertilization;" and since the word is used in two entirely different meanings it may be well to define it and explain more fully what takes place during each act. We say that a queen is fertilized when she takes her marriage-flight and meets a drone, and that a worker egg

is fertilized as it passes down the oviduct of the queen; and it is evident that the word is used with entirely different significance in the two cases.

Let us first define the word as used in connection with the marriage-flight. The queen flies from the hive, circles in the air, first in small and then in larger circles, then suddenly starts upward followed by the drones. This much is easily seen; but no one has, I believe, been able to describe any more of the flight. The queen returns to the hive later, carrying with her the copulatory organ of the drone, and after a little this is ejected. The essential part is, however, that her spermatheca, or seminal receptacle, is filled with spermatozoa during the marriage-flight. The number of these has been estimated at from two to twenty million, and it is at least certain that she receives enough so that she can keep on laying worker eggs for four or five years. The spermatozoa are the essential things in this fertilization, and not the fluid in which they float, and these do not divide or increase in number in any way after they enter the queen.

A question that comes to mind in this

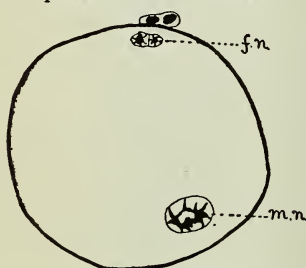


FIG. 1.—Egg of *ASCARIS* just after maturation; fn, female nucleus; m n, male nucleus.

connection is, whether the queen takes more than one marriage-flight. We do know she takes several small preparatory flights, and I have been recently informed by a man whom I consider a careful observer that he has seen the same queen enter her hive two or three times with the male organs hanging to her. This is a thing which all queen-breeders should know positively, and there is but one way to find out. The text-books say she meets but one drone, and we will presume that they are probably right; but it is not positively settled, it seems. The way to test this is to get down by the hive every afternoon during the time of flight, and stay there until the queen is seen to fly and return. If she enters one day with the organs attached, and these are removed before noon the next day, and then she flies again and returns with the organs of another drone, it is conclusive proof that she has met more than one. It will not do to guess or theorize about this, and no one has a right to express an opinion on this in a public way unless he has actually stayed by the hive all afternoon for several days, and would then be willing to swear by his observations. If any of the readers of this journal have the patience and interest to try this I should be glad to hear of it; and I will myself, during the coming summer,

take up the observation, and report. It will be admitted by all, I think, that in too many things we are willing to take the word of some one else without being sure that his observations are careful; and it is very desirable to get as many facts as possible on this subject—facts concerning which there is no room for doubt.

The fertilization of an egg is an entirely different phenomenon. As the egg comes down the oviduct of the queen it passes the entrance of the spermatheca; and if it is to be a worker egg it receives from the spermatheca one spermatozoon through the

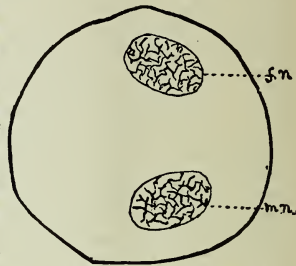


FIG. 2.—Egg of *ASCARIS* just later than Fig. 1.

opening in the end next to the ovary, called the micropyle. This one spermatozoon carries with it the hereditary influences from the male parent; and, although very small in comparison with the egg, yet it contains just as many of the carriers of heredity as does the egg which comes from the ovary of the queen. I myself have never seen the fertilization of a bee's egg; but the phenomenon has been most accurately observed on many eggs, and I will describe what takes place in the eggs of the parasitic round worm from the intestine of the horse, *Ascaris megalocephala*, where I have repeatedly observed it. This is preferable for two reasons: First, the mechanics of fertilization are more simple; and, second, the observation has been made on this by many zoologists, and is reliable. There is every reason to suppose that it is exactly what takes place in every animal, for so far no one has found a case which differs.

The unfertilized egg of *Ascaris* has a nu-

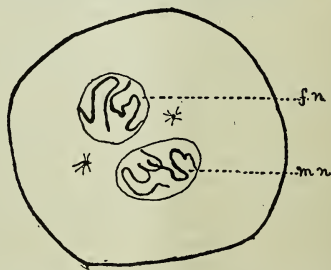


FIG. 3.—Egg of *ASCARIS*, later than Fig. 2; chromosomes being gathered together.

cleus which contains four bodies called chromosomes. They are, however, broken up into finer divisions; but the egg then enters upon a series of changes called the maturation of the egg, and then these chromosomes become definite in shape, and can be easily counted. In the maturation, two

of these chromosomes are thrown out of the egg, and perish, leaving *two* in the mature egg, or just half the previous number. The process of maturation is a very complicated one, but it is not necessary to give more than the final result. During the process of maturation the spermatozoon, or male cell, enters the egg, and its nucleus also contains broken-up chromosomes. As soon as the maturation is completed, the male nucleus and egg, or female nucleus, move toward each other, and the chromosomes take definite shape, and then we see that *each nucleus has two chromosomes*. These then unite, and the egg goes on developing, and from this time on *four* chromosomes are always seen.

Now, it is held by many careful observers that these chromosomes are the carriers of hereditary influences; and it is evident that there is an equal amount in the egg from each of the two parents.

The fertilization of an egg, then, consists in the uniting of two aggregations of hereditary influences, and with this union comes a stimulus to growth. When fertilization is not to take place, as in the drone eggs of the bee, the normal number of chromosomes is retained in the egg, and none are necessary from the spermatozoon; and, as a result, one parent furnishes all the hereditary influences.

Since, then, as much of the hereditary influence comes from the male as from the female, in the case of worker and queen eggs, it is just as necessary to use judgment in the choice of the males as is used for the females.



FIG. 4.—Egg of ASCARIS just before union of the two nuclei; chromosomes no longer broken up.

If I have not made the description as clear as it might be made, it may be that it will not be evident to all the readers of this just what takes place during fertilization; but one thing I want to state as strongly as possible, and that is, that the male influence is as great as the female; and to raise good bees you must have good drones. I state this emphatically, because I have within a week or so of the writing of this heard of at least one queen-breeder who is not as careful in this matter as he should be; and it is no doubt true that there are others equally negligent. I can say this and condemn the carelessness, because the man himself does not know that I know the

facts, and I will see to it that no one finds out from me who he is; but if it should happen that the shoe fits any one reading this paper it is hoped that it will be worn, and, for the sake of the science of apiculture, that more care will be exercised.

Philadelphia, Pa.

To be Continued.



FEEDING UNFINISHED SECTIONS OUTDOORS; A CAUTION.

I have a lot of unfinished sections on hand, also some cases of dark unsalable honey, and have started to feed, to have young bees out early. Our bees here swarm from the end of April until June; that is, the first swarms. Do you think it a good plan to feed thus? I put a cover on top, and let the bees go in the length of one side of the super from the bottom, just a bee-space.

R. WILLIAMS.

Grass Valley, Cal.

[You can feed honey this way, but you need to be very cautious or you will have an uproar among the bees on account of robbing. I would advise putting such unfinished sections in a hive and then contract the entrance down so that only about one or two bees can pass at a time. Where a large number can rush upon a large amount of sweet like this at a time it causes a stampede and general robbing throughout the yard, the trouble being very greatly aggravated after the honey is all gone. You can feed your extracted, but I would advise diluting it down with water so that it is little more than sweetened water.—Ed.]

EGGS IN THE SUPERS OF SHALLOW HIVES.

I notice that you are recommending the Danzenbaker hive, which has frames still shallower than the Dovetailed. Isn't the queen more apt to lay eggs in the sections when on shallow frames than if deeper ones were used? I use the eight-frame Dovetailed hive, and use some honey-boards, which seem to hinder the bees more or less from working in supers. Isn't there some way to keep the queen from going into the sections without the use of honey-boards? Some bee-keepers advise me to get deeper brood-frames. Would a deeper frame than the Hoffman prevent this trouble?

Mt. Carroll, Ill.

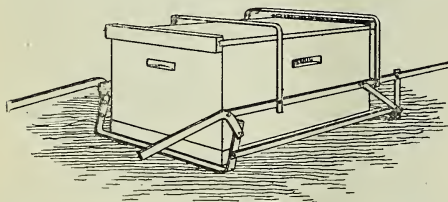
H. C. DAGGERT.

[The Danzenbaker hive has practically the same cubic capacity as the regular eight-frame Langstroth. While the frames are a little shallower than the L., they are not enough shallower to force eggs or brood

up into the supers. Queen-excluders are not generally used in the production of *comb* honey, as their use is not found necessary, except in some localities with some bees; but they are almost indispensable in the production of *extracted* honey. While some bee-keepers get along without them, the great majority find them a great convenience in that the honey is confined to the supers, and the brood to the lower part of the hive.—Ed.]

A HANDY HIVE-CARRIER.

I am sending you a hive-carrier. I used it in putting in my own bees, and find it much easier work with the carrier, as I can carry them into the cellar and pile them up without setting them down. It does away with a lot of heavy lifting. With it I can tier up the hives in double rows with backs six to eight inches apart, and four inches apart in the rows. The carrier sent is made for ten-frame bottom-boards, 22 in.



long, but will pick up boards up to 23½ in. just as well. It is the only one I have made, and can be improved; but you will be able to tell whether or not any thing as good or better has been gotten up before now. The material cost about 50 cts.

Oshkosh, Wis. H. E. GREENWOOD.

[We have tried this carrier, and find that it bites on to the bottom-board very nicely. The mere act of lifting up on the handles or levers produces a powerful pressure through the toggle joint and second lever on the front of the board. As soon as the handles are let go of, the lifting-device instantly releases itself. This tool would be handy in piling hives up in tiers.—Ed.]

CUTTING BEE-TREES—A CAUTION.

A subscriber sends us the following clipping from the Tioga, N. Y., *Herald*:

When this country was new, a man who found a bee-tree in the woods was allowed to claim it, cut the tree, and take the honey, and bee-trees are generally regarded in that light as free plunder. However, recently in a neighboring county two men who cut a bee-tree and secured 125 lbs. of honey were arrested by the owner of the property. The case was tried in court. The men were compelled to pay \$1.00 each for trespass, \$5 for cutting the tree, and \$20 for the honey.

No one should think of cutting a bee-tree, nor any other kind of tree, without first getting the full consent of the owner. Timber and timber land are of far greater value at the present time than when the country was new.—Ed.

THE FEASIBILITY OF PUTTING A COMB-HONEY SUPER BETWEEN THE BROOD-SECTIONS OF A SECTIONAL BEE-HIVE.

If I have a swarm in a brood-chamber composed of two shallow extracting-supers filled with shallow extracting-frames (and starters) and, in three to five days, when some comb is built for the queen to lay in, I lift up the upper one and place a super of sections on, and put the lifted-up part back on this super of sections, thus putting sections in between the two divisions, what will be the result as to obtaining comb honey?

I do not remember reading of any such experiment. R. A. WHITFIELD.

Weathersby, Miss.

[We have tried the plan described, but have not found it to be very satisfactory. One objection is that pollen and brood are liable to be crowded into the sections; and another one seems to be that the bees do not like to have the brood-apartment separated by a mass of honey. We tried it on a number of colonies some years ago, but the results were very disappointing in more ways than one.—Ed.]

WINTERING A LA BARBER WITHOUT VENTILATION IN A CELLAR.

I notice an article by Mr. Ira Barber, on cellar wintering without ventilation. I have wintered my bees in the same way Mr. Barber speaks of, for ten years, and have had very good luck. I partitioned off a space with paper sheeting to keep out the light. The spring of 1903 I had 27 colonies in the cellar, and lost two; one was queenless, and one died by starvation last spring. I put into the cellar 52, and lost one that was queenless. Now, if you make Mr. Barber a visit I should like to have you look into my cellar, as I live about four miles from his old yard. J. S. DEAN.

Rensselaer Falls, N. Y.

[I shall be glad to call upon you if I can get away.—Ed.]

BLEACHING HONEY, ETC.

I should like to inquire if there is any known method of bleaching highly colored honey so that it can be made to look white or nearly so. I should also like to know if one-gallon friction-top tin cans are not just as good for extracted honey in the market as 60 lb. cans providing the cost is no more.

Dexter, Me.

A. R. BODGE.

[Comb honey can be bleached to a considerable extent by exposure to sunlight, subdued by some white screen in hot weather. If you refer to extracted, I know of no method by which it can be bleached except to mix it with some white honey, and, as a rule, this would be poor business policy. The two honeys sold separately for what they would bring will net the seller more money than the mixed product. Some un-

scrupulous buyers and sometimes bee-keepers have resorted to putting the glucose into dark honey to improve its appearance and flavor. But the skilled chemist is able to detect unerringly such bogus mixtures.

Certainly a one-gallon square can is as good as a five-gallon if it can be bought at the same price. As yet, that condition is very unusual.—ED.]

CONTROLLING SWARMING DURING THE ABSENCE OF THE APIARIST.

Will you please tell me how to manage my bees during swarming? I have about ten stands, and have other employment that compels me to be absent from 7 A. M. to 6 P. M. each day.

Some say, clip your queens; then when they swarm have some one of the family remove the old hive, and place a new one in its place. This does not answer my case, as no one in my family will go about the bees. Others say, shake them. This will not do for me, as I have tried it on three colonies this year, and every one was a failure, the bees leaving their hive a day or two afterward. G. J. STURM.

Flora, Ill., Dec. 26.

[I scarcely know what plan to recommend to you if you are not so situated as to use the shake-out or clipped-wing plan; but you can hardly condemn the former method until you have tried it on a little more extended scale. If you will be content to produce some extracted and some comb honey, make the colonies very strong, in large hives. Such will not be apt to swarm. As a further precaution I would advise having the queen's wings clipped. While, perhaps, there will be no one at home to take care of the bees in case they come out, some member of your family could report that such and such a hive had cast a swarm. This would make it necessary for you either to shake the bees into the new hive on the old stand or divide them up; for a colony that attempts once to swarm is pretty sure to carry out its intent if thwarted.—ED.]

IS IT ADVISABLE TO STORE HONEY IN OIL-BARRELS?

Would it be safe to store extracted honey in Wesson oil barrels? If so, how should they be treated to prevent them from imparting any flavor to the honey? Would ko nut barrels be preferable to Wesson oil-barrels?

W. H. LITTLEJOHN.

Battle Creek, Mich.

[I would not advise you to store honey in oil-tanks or oil-barrels of any kind. You will be sure to ruin the honey. The other barrels I do not know much about, but I do not think it would be wise to try them. Honey is very susceptible, and readily takes on flavors already in wooden packages. Your better way is to use new barrels or square tin cans. You can use second-hand alcohol or whisky barrels, but they should be thoroughly washed out, then coated on

the inside with wax or paraffine. Melt 2 lbs. of paraffine; pour it into the bung-hole; drive in the bung; roll the barrel around, and end it up; then pour out the remainder, but be careful or the bung will fly as soon as you begin to loosen it.—ED.]

ELECTRIC OR PHOSPHORESCENT SPARKS FROM BEES.

I wish to call attention to a phenomenon I observed one evening last fall in connection with my bees—one that I have never seen mentioned concerning them. One dark evening I had occasion to disturb a colony. The night being warm, quite a number poured out on the board, and ran about excitedly in great rage, and I distinctly noticed several sparks of some form of electricity or phosphorescence. Whether this was due to heat, friction, or excitement, or some spontaneous action, I can not say; but I am satisfied I observed the flashes or glow of light. You may smile at this; but if any one has ever noticed this phenomenon before I should like to hear of it.

Kan., Feb. 15.

W. S. H.

[The light that you saw *may* have been something of the nature of phosphorescence; but if there has been any thing of this kind that has ever before been observed in a hive I have seen no reports of it. I shall be glad to get reports from others.

You will remember there was an old joke that went the rounds of the press, and every now and then bobs up as something new under the sun, to the effect that a certain scientist had made the wonderful discovery that bees and lightning-bugs could be crossed so that the bees could work by night as well as by day. I do not suppose your bees were this kind of hybrids. If your letter did not bear the marks of evident sincerity, I should think you were trying to get off another lightning-bug joke.—ED.]

HOW TO MAKE ZINC NUMBERING-TAGS.

Referring to tags (see Straws, Dec. 1), I use zinc tags prepared as follows: Dip the zinc in melted beeswax so as to secure a thin covering of wax. After it has cooled, with a metal stylus write your figures in the wax, then fill the etching with muriatic acid. Allow it to eat into the zinc for two minutes, then plunge in water; afterward scrape off the wax, and you have a durable inexpensive tag. H. I. LARCOMBE.

Bettsville, Md.

CAPTAIN HETHERINGTON'S DEATH MOURNED IN EUROPE.

The death of Capt. Hetherington, that prince of American bee-keepers, as you call him, very much affected us. We always have much esteem for all Americans, and veterans more especially, and we feel as if a friend in the great family of bee-keepers were wanting. Now another one is gone home. P. J. BALDENSPERGER.

Nice, France.



Is any sick among you? let him call for the elders of the church; and let them pray over him, anointing him with oil in the name of the Lord.—JAMES 5:14.

Ever since I began reading the Bible carefully and prayerfully I have wondered that there is so little said in it regarding caring for the sick, curing disease, etc. Of course, there were prophets in the olden time who healed by word or touch; but even when God dealt directly with his children, there seems to be an absence of any specific directions for the care of these bodies of ours. Among the ten commandments given to Moses there is one that says, "Honor thy father and thy mother, that thy days may be long upon the land," etc. This is a remote reference to the matter of health and length of life; but, if I am correct, it is the only one of the commandments that really has much to say about the matter. The Bible seems to be especially devoted to the *moral* and *spiritual* health of humanity. But for all this it has seemed strange to me that the all-seeing Father should not have told us more about what his wishes are in the way of using remedies, and regarding the whole matter of healing the sick. Later on, when Jesus came down from his home in heaven because of his love and sympathy for poor humanity, while he gave rules and laid down directions without number for our moral and spiritual up-building, he has, I have sometimes thought, almost *avoided* either discussing or *indorsing* the common methods of healing the sick. Of course, it is true no medicines or remedies were ever needed whenever *he* was near, for he was the *great* healer, the one physician who *never* lost a patient. But why did he not give us some specific rules that might be a help to us after he had gone back to his heavenly home? It is evident the Bible is not in any sense a "*doctor book*." There are various places where we are told to pray when in trouble of any kind; and our text is clear and distinct in regard to this matter. But the words of the text are not the words of *Jesus*. James is supposed to be the brother of our Lord, or at least the son of Joseph the husband of the virgin Mary. Now, may be our ministerial brethren will think I am not quite orthodox when I suggest that James could *not* speak with the same authority that the Savior did. I believe James is right; but I do not believe he had divine inspiration so that he knew about these things as did God the Father, or Jesus the Son later on.

I have always curiously considered this expression about anointing with oil; and several times, if I am correct, pious people have undertaken to heal diseases by praying over and anointing the sick with oil; and sometimes I have wondered what kind of oil James had in mind, and I have won-

dered, too, whether it were possible, among the great mass of remedies in vogue in his time, he meant to recognize the value of only this one. Jesus tells us, in that wonderful parable, that the good Samaritan poured "oil and wine" on the wounds of the poor sufferer. Did he, by this expression, intend to authorize the use of oil and wine as remedies?

Just a few days ago that excellent periodical, the *Sunday School Times*, gave me a little light on this matter. They made a statement something like this: The inspired writers seemed to fall in line with the general belief of the time in which they wrote, and they simply meant to indorse harmless remedies; and what James intended, when he spoke about oil, was only an exhortation to the people to do the best they could or the best they knew how for a suffering brother. In his day oil was one of the remedies in use, and it is a good one still. I have seen mechanics take an oil-can and pour oil on a sore or a burn that was hot and feverish. When my corns and chilblains become dry, and the flesh hard and painful, a little nice oil, or vaseline (which is the same thing), sometimes gives wonderful relief. Sometimes the smarting of a burn may be stopped almost instantly by the use of oil. Now, James simply intended that we should make use of every thing we could lay our hands on for a suffering friend, at the same time we prayed for wisdom and understanding. When Jesus spoke of what the good Samaritan did, it seems quite probable to me it was along in the same line, and so on all through the Bible.

Do some of you ask why God the Father or Jesus the son did *not* tell us more about this vital question that so much concerns human happiness? I might say I really do not know; but on a little more reflection I really do know something about it—at least I think I do. The father who helps his child over every log he comes to, especially after that child is large enough to climb and work hard himself, is doing the child an injury. You can find rich men's children who are really "crippled for life" in this very way. For some reason which I do not exactly understand, God seems to think best to let us work out our own physical salvation through much pain and suffering. This thing we *do* know—that Christian nations are making far greater progress in the way of securing general physical health than heathen nations. We know, too, that righteousness and Christianity are highly conducive to the highest state of health to any people. I have not touched on Christian Science yet; but you may have gathered that I have but little faith in Christian Science or any thing of that sort unless it is coupled with an honest, earnest faith in the Lord Jesus Christ. I believe in the kind of religion that, *while* it prays, it also looks after the matter of pure water to drink, sends the patient out of doors to get over consumption by the use of *pure air*, and *general* cleanliness and purity, not

only for all that are sick, but for everybody else.

The above is a rather long preface, it is true; but it is simply a preface to an account of some personal experiences I have had of late. In fact, the above thoughts had been considerably in my mind toward the close of the year 1903. I think I will choose for a heading to this talk,

WHEN SHALL WE SEND FOR THE DOCTOR?

On Christmas eve, when I returned from our annual gathering at our church, Mrs. Root and I retired about as usual. She did not go to the Sunday-school gathering on Christmas eve with all the rest. About ten o'clock she did not seem to be able to get any sleep, and said she believed she was going to have one of her attacks of pleurisy. She has been subject to such attacks off and on most of her life. In a short time the pain became very much more acute than usual, and she was suffering greatly. All through the long night I begged to be permitted to call a doctor, which I could easily do by the use of the telephone. She objected every time. Now, it would hardly be fair to say that Mrs. Root does not believe in doctors, for she does, and not only respects but reverences the family physician when he is a good man, as a doctor always ought to be; but she has a theory that doctors are called a good many times when there is no particular need of it. She was so vehement in declaring that she could manage the attack without the help of any doctor, as she had often done before, that no doctor was called till next day in the afternoon; and even then myself and the children were almost obliged to overrule her wishes in the matter. The doctor said it was a very severe attack of pleurisy, and was likely to result in pleuro-pneumonia. When I told him we urged her to call him at the first attack he said something like this:

"Mr. Root, if your house were on fire would you wait half a day or more to see whether the fire was going to do any harm? or would you put it out when the blaze was small?"

Very likely the doctor was right in saying that our procrastination was something like letting the fire burn until it was well under way. Mrs. Root and I have both tried since that affair to see if we could decide what brought on this sudden and severe attack. The day before Christmas, for a few hours it was warm and rainy. She ventured across the street, without any covering over her head, and with only a light shawl; but this she has been doing all her life—in fact, she has always delighted in showing the children how she could run around outdoors bareheaded, and without being bundled up (like your humble servant, for instance). Two days before the attack she went with me in the auto, and visited a sick relative, perhaps a mile from home. While going with the wind we were both quite comfortable; but the return trip was against the wind. Neither of us was

very warmly clad. On this account I hurried home to get where it was warm. She rode against the stiff south breeze, and was pretty well chilled when we reached our own warm rooms.* But she and I had often had this same experience, and never before felt any bad effects of it. The doctors say that her general health must have been poor about that time; but she and I feel positive she was in excellent health and spirits until the attack. I do not know *what* brought it on.

Christmas came on Friday, and by Sunday night she was a very sick woman. Thus far in our married life we have never had any experience with a trained city nurse; but just then all the children insisted that mother should have the best help that could be obtained. The nurse and doctor did their best; but on Sunday night the pneumonia had taken such complete possession of her lungs that it was difficult for her to breathe. I heard the nurse calling through the telephone to the doctor to hurry down as soon as possible—that the patient's heart was acting very badly. While the nurse was at the telephone I slipped up to my wife's bedside and placed my finger on her pulse, as I had been in the habit of doing all along. The pulse was very weak and irregular. Finally there came a great throb; then three or four little beats almost like the tick of a watch, irregular in time and varying greatly in force. The doctor got there very quickly, and he told me there was great danger. Unless the heart could be quieted, she might not live till morning. One of the best physicians we knew of in Cleveland was summoned by telephone. An extra nurse was ordered, to be with the patient while the regular nurse slept. Soon after I had tested the pulse Mrs. Root looked up at me inquiringly.

"Amos, what is all this commotion about?"

Now, I have never withheld any secrets from Mrs. Root—at least not for years past; and I know, if the rest of the world does not, that she is cool and steady enough to be told the truth without being disturbed or frightened. Notwithstanding this, I did not feel that it was my duty to tell her just what the trouble was. While I debated what answer I should make, I said, by way of evasion:

*I have been told that large numbers of people have contracted severe colds, sometimes resulting in pneumonia, from riding in an open automobile during very low temperatures. The unusual rush of air, especially when one goes against the wind, requires extra clothing and wraps; and dealers in automobile supplies are already advertising garments made specially for winter automobling. Why, even during the month of July, on that trip through Michigan last summer, I was obliged to wear a summer overcoat a great part of the time, especially when we were running *against* the wind; and a few times I was obliged to exchange my summer cap for the fur cap I wear in winter. The rush of air is all right; but elderly people should remember to keep well clothed. When I was bundled up with a fur cap and overcoat, twenty-year-old Huber was happy in his shirtsleeves, without any collar or necktie.

"Shall I tell you, dear wife, just what the matter is?"

I suppose our friends will all excuse me when I say that I made this reply in order to gain a little time before answering further. She replied, "Yes, tell me what it is that worries you all."

She had been suffering on account of a lack of sleep, as she always does under similar circumstances, so I replied, "We are all worried because you are suffering from a loss of sleep; for if you do not get some sleep how can you resist the fever that has got such a hold on you?"

"Then if I go to sleep will you all feel relieved?"

Rejoicing that I had so successfully steered her off the track, I was going to drop the subject. She shut her eyes as if to try to sleep; and in a few moments afterward, in a feeble voice, she said, "I did not know but you were worried about my heart, for I felt it fluttering."

Just then I said I would go below to look after the temperature of the rooms; but I felt in real truth as if I must go away by myself where I could pray. In the apartment below, just under the bed where the dear patient lay suffering, I knelt and poured out my heart in silent prayer. I had many times tried to pray since her sickness; but it seemed to be a cold and mechanical prayer. I did not realize the danger. Just then, however, our two lives seemed to pass in a panorama before me; and then I looked out into the future and tried to catch a glimpse of what my life would be without her daily counsel and loving sympathy. I realized that thousands of others had met such trials, and were bearing them as best they could; and I remember feeling ashamed of the selfish cowardly spirit that prompted me to say in anguish, "O God, I can not bear it, I can not bear even the *thought* of it."

As I prayed I became more tranquil, and I tried to say, as did the dear Savior, "Nevertheless, not my will, but thine, be done."

Now, dear reader, before resorting to prayer I had done everything that poor humanity could do. I had counseled with our physician, and with his sanction I had called the best medical help our State afforded. We had availed ourselves, also, of the best nurses, two of them, so that she could not suffer one single minute from neglect. The five children were also near, with my two sons-in-law and one daughter-in-law, each vying with the other to see what else could be done for the suffering mother. After having done every thing that this present age could afford for the sick, *then* I could pray *earnestly* that the great Father would look down in pity and loving sympathy, and listen to his helpless children. Jesus says, you know, "If ye, then, being evil, know how to give good gifts unto your children, how much more shall your heavenly Father give the Holy Spirit to them that ask him?"

As I went back to the sick-bed I felt that the Holy Spirit was with us, even though my request should not be granted. One special thing was revealed to me as I knelt there alone in the middle of the night—the fact that we are so prone to be selfish in a time like this. I was not praying for humanity—in fact, I was not even praying, at least *then and there*, for sick people generally, or that the physicians and nurses of the *world* should have more skill and knowledge. I was only beseeching the dear Father to spare to me just a few years longer the dear companion of my home and my life. Why should I or why should we in times like this expect that God was going to favor *us* particularly when thousands were suffering may be many times more than we suffer? May God help us, while we are praying for the sick, to strive more to make our prayers unselfish ones.

In my next I wish to give you some helpful suggestions in regard to the modern methods of treating the sick; and I will confess to you that one desire (of course, it was a minor one) in this whole affair was to find out what had been accomplished in modern times in the way of relieving sickness and suffering. It does not always follow that people are cured by getting the most expensive doctors and nurses; yet if the science of medicine is making *real* progress there ought to be a better chance for the patient when we hunt up the best-educated and most skillful physicians and nurses.

To be Continued.

Temperance.

LOCAL OPTION IN ARIZONA.

While visiting at friend Jefferson's in Safford, Arizona (see page 26), I was introduced to quite a lot of temperance people, and they told me of the fight they were making to banish the saloon. Just now friend Jefferson sends me a report of the contest. We quote one sentence:

Each side did its best, and the result shows the true state of public sentiment in the place on the question, there being 109 votes in favor of local option, and 82 in favor of the saloons, the latter winning out by the narrow margin of 19.

Now, the queer thing to me in the above is that it takes *two* votes for temperance to balance one vote for whisky; and yet they call it "local option." I supposed local option meant that the *majority* should rule. But that is not all the trouble. Mr. Calvert, my son-in-law, tells me that in Canada, where he came from, they have the same beneficent(?) ruling to guard the morals of the people. May I be permitted to ask who perpetrated such an outrage on decency, both in Arizona and Canada? Surely Queen Victoria never introduced such a regulation. It is "local option," you see, but you must have two temperance votes to match one saloonist. I hope I am

making a mistake. Can it be that all of *Arizona* is under such a ruling? Canada is not exactly our job.



We clip the following from the *Country Gentleman* for Nov. 26, 1903. While there are probably some mistakes in regard to the amount of the crop, and where it is mostly raised, I think the article is, in the main, substantially correct. With the present price of buckwheat grain, it well behooves bee-keeping farmers to give more attention to this crop.

THE CULTURE AND USES OF BUCKWHEAT.

The largest buckwheat crop ever harvested is now being gathered in the two great buckwheat-raising States, New York and Pennsylvania. Just how large it will be can not yet be told, although the two States named will certainly produce more than 7,000,000 bushels, against 6,488,560 bushels last year. As the production of the entire country a year ago was but 9,586,966 bushels, valued at \$5,311,413, grown on 637,930 acres of ground, it will be seen how important the crop of these two States is to all lovers of the buckwheat cake.

Buckwheat is raised in 24 States, growing as far south as Georgia and as far north as Maine. Last year New York stood at the head of the column of producing States with a crop of 3,280,158 bushels, with Pennsylvania a close second with 3,183,402 bushels. Third on the list was Maine, with only 719,760 bushels to her credit, while little Delaware came trailing in at the last with 3150 bushels. The average price realized by the farmers was 36 cents per bushel, and the average yield was 15 bushels to the acre. Basing their calculations on a comparison of crop hazards, and the cost of the necessary fertilizers and labor, expert agriculturists estimate that it is more profitable to raise buckwheat at 50 cents than wheat at a dollar. It is, therefore, not surprising that the farmers of the older States are giving more and more attention to this cereal every year.

The four counties of Armstrong, Indiana, Westmoreland, and Butler, in Pennsylvania, have earned for themselves the title of the "buckwheat belt." In no other equal area in the United States is so much of this crop raised, as these four counties produce probably four-fifths of all that raised in Pennsylvania. The production of New York is greater than that of the Keystone State, but is more generally distributed, and not confined to a comparatively restricted area.

The buckwheat cake is a peculiarly American institution—as much so as the pumpkin pie, roast turkey, and other toothsome delicacies dear to the heart of the epicure. The crop is cultivated in many lands, but the housewives of no other country have learned how to prepare it in such a manner as to tickle the palate of the lover of good living. In Great Britain it is considered unfit for human consumption, and is used only as food for pheasants and poultry. It is cultivated in India, where it is used on "bait" or feast days, being one of the foods that are lawful on those occasions. It is served to the Russian soldiers as a part of their rations, but is prepared in such a manner that it is said that no one but a Cossack or a starving man can eat it. In France it is called "sarsin," and is used as food by the very poorest of the peasantry. The French name is a bit of fossilized history, being a reminder of the fact that the grain was introduced into Western Europe by the Crusaders, who obtained it from the Saracens of Asia Minor.

In Germany this grain is fed to cattle and poultry, but is not highly esteemed as food for human beings. Beer is there brewed from it, and it is sometimes used in gin-distilleries. The German name is "buckweizen," or buck wheat, so called from the resemblance of the sharp triangular grains to beechnuts. In Japan it is extensively used as an article of diet, and the Japanese variety is one of the most highly esteemed and

most extensively cultivated by American farmers the Japanese variety being considered more productive and hardy than the European or "silverhull." The grain is supposed to be a native of the basin of the Volga, the shores of the Caspian Sea, and parts of Central Asia. Probably it was introduced into China and Japan by marauding Tartars, centuries before it became known to Europeans.

Not many years ago buckwheat cakes were eaten only by the very poor of the rural districts. They ate them, not because they liked them, but as a measure of economy. There was no market for the grain or flour; and where it was grown at all it was fed to livestock, or eaten only in default of any thing better. It will grow on the poorest soil, where no other crop can be raised. It matures very quickly, and a crop failure is hardly ever known. But little fertilizer is required, and that of the cheapest grade, so that it is pre-eminently the poor man's crop.

Among the poor bee-keepers, buckwheat is a favorite crop because the blossoms contain a greater percentage of honey than is found in the flowers of any other plant of economic use aside from its value as a honey producer. As long as buckwheat is in flower the bees of the neighborhood confine themselves entirely to it, thus producing pure buckwheat honey. The market value of this is impaired by the fact that it is of dark amber color, instead of the clear white demanded by the fastidious city trade. In making this exaction city customers show their own ignorance; and but few of them who have ever tried genuine buckwheat honey would be willing to exchange it for the finest grade of "white clover." And surely no lover of buckwheat cakes will deny that it accords with the eternal fitness of things that they be well lubricated with honey made from buckwheat blossoms before being started to their last resting-place on the inside of a capacious waist-coat.

Buckwheat makes practically all its growth in six weeks of hot weather in July and August, being the most rapid-growing of farm crops. For this reason it is supposed to be very exhausting on the soil, so that the owners of fertile farms will not raise it. This is no doubt the reason why Butler, Armstrong, Westmoreland, and Indiana Counties have become pre-eminently the buckwheat belt. Those counties are full of bald knobs that have been cultivated for over a century, until all the natural fertility of the soil that has not been extracted by the crops has been washed down by the rains into the valleys below. They will produce nothing but buckwheat or beans; and as buckwheat brings in the greater returns with less labor, buckwheat is the crop that is preferred. Possibly the time will come when these wornout and impoverished farms will no longer produce even buckwheat; but with firm faith in a beneficent Providence, and in the efficacy of commercial fertilizers, the farmers are losing no sleep over that contingency.

Buckwheat is sown broadcast, or drilled into the ground, about the first or middle of July, and is harvested as soon as the first frosts kill the last lingering blossoms. The sheaves are allowed to stand in the field a few days, until the peripatetic steam-thresher comes around, when the crop is hauled in and thrashed. This is really the most critical season of the year for the buckwheat farmer. Often a large crop is nearly ruined by a few days' wet weather after the grain has been cut, but before it has been thrashed.

It is a busy and exacting time for the owners of traction engines and thrashing machines, to whom the whole farming community look to save their crop from possible destruction. Often they work till midnight and then travel for miles in order to be ready to begin work at the next stopping-place by sunrise. And in case heavy rains or early snows work havoc with the unthrashed grain, it is the tardy thrasher who must bear the blame.

SOME FACTS, CRITICISMS, ETC.

By way of introduction I will say that I am not much interested in bees now, but continue to take GLEANINGS, partly from habit and partly for the notes on travel and gardening.

GIANT GIBRALTAR ONIONS.

In 1902, 8 sq. rods planted to Giant Gibraltar gave me about 15 bushels of nice bulbs and a lot of trash, while White Globe, under the same conditions, yielded at the rate of more than 800 bushels to the acre. I have no further use for the former.

POTATO CULTURE AND FERTILIZERS.

Mr. Terry's "adverse experience" with fertilizers is a matter of interest, and his advice to "be perfectly sure you are right" is good. I submit, however, that

his quotation from Director Thorne (sup. 29) is misleading—likely to leave a wrong impression concerning the teachings of the Station. In Bul. 94 June, 1898, page 325, the Director said this: The point insisted upon was that the price of fertilizers was too high in proportion to the value of the crops produced—not that the fertilizers did not produce increase of crop. On the contrary, this station's experience constantly showed a larger increase of crop from certain artificial fertilizers than from barnyard manure." Again, in Bul. 71, April, 1896, page 185, "When fertilizers have been used on potatoes there has been a good profit, with ordinary yields and average prices of potatoes."

FARMERS' WIVES.

The reason which you give for so many farmers' wives going insane is amusing, and reminds me of the story of the wise men who gave long scientific reasons for a fact—a fact that wasn't so. The report of the State Board of Charities of Pennsylvania, as quoted in the *Stockman and Farmer*, Jan. 6, 1898, shows this concerning the patients admitted the previous year: Of 1060 male patients, 139 had been farmers; and of 806 female patients, 32 were farmers' wives; 28 were farmers' daughters, and 6 were farmers' widows—66 in all.

Ohio statistics for 1885 and 1894, the only copies which I have at hand, show that men constitute a majority of the patients in Ohio, as in Pennsylvania, but do not tell what their avocation had been. Better make sure that it is so before you worry any more about farmers' wives being neglected.

East Springfield, O. R. M. REYNOLDS.

Friend R., I am exceedingly obliged to you for your facts, especially for the criticisms. I think you must have had poor seed of the Giant Gibraltar onion. The crop of seed has been short for several years, and on this account almost every thing has been saved. The first small lots of seed I had for tests gave very much better results than that for two years back. As they are very much larger than the White Globe, I hope we may be able to get a strain of seed that will give a good big onion from every plant. During my visits to the Ohio Experiment Station I had reports like what you have mentioned, in regard to fertilizers for potatoes; and at the price potatoes are worth now—almost a dollar a bushel—it will probably pay many farmers to use the right kind of chemical fertilizers. Last, but not least, I rejoice to know that farmers' wives are *not* all "going crazy." The statement I saw was given in a daily paper, and I did not look for any statistics to corroborate it. We can well rejoice that it is not true.

WINTER VETCH.

The report below, clipped from the *Country Gentleman*, comes from our old friend M. M. Baldridge; and his concluding sentence would indicate that, in many places, it might be a wonderful help—that is, if one seeding can be made to give a crop for fifteen years.

I am greatly interested in the winter vetch, having grown the same in an experimental way for several years past. It is a wonderful plant to stool when given a proper chance. One peck (15 lbs.) of seed is plenty to sow to the acre. This vetch should be grown with wheat or rye in the North as a support to hold the plants up and off the ground. One-half bushel of either grain is ample to the acre. This variety of vetch may be sown either in the spring or fall; but when wanted to produce seed, it must be sown in the fall.

My experience says that the plant must be grown so late in the year that it will not bloom until it has passed through the winter. It will then produce seed freely in the following June or July.

In Mississippi the vetch is grown with winter oats, both being sown in the fall. The crop there is pas-

tured from December to March. The live stock is then taken off and the double crop is permitted to grow for hay or seed, after which the land is flatbroken and planted immediately with cow peas. When the vetch is grown for grain or seed, the land is found to be nicely reseeded with oats and vetch when the cow peas are ready to be cut for hay or harvested for peas.

One of my correspondents in Mississippi has grown this double crop for about fifteen years, and from only a single seeding, and each year has secured a good crop of cow peas besides. He grows this double crop on a large scale—100 acres and upward per year. His average crop of oats and vetch is about forty bushels per acre, and this is sold, without separating, and for seeding purposes, at \$1.00 per bushel.

THE NEW DISEASE OF THE POTATO—THE ROSETTE.

For several years past I have noticed on our Medina soils here and there a hill of potatoes with the foliage curled and twisted up, something like the curl-leaf of the peach-tree, but with the potato the whole hill was dwarfed. One of my reasons for changing my potato-growing to Northern Michigan was that I might escape this trouble (and scab) by starting on new ground that had never grown a crop. But I was a good deal discouraged to find more or less of this trouble with the potatoes in Michigan. It was probably carried in the seed. Some years ago I called the attention of our Ohio Experiment Station to the matter. Below is the result of their experiments:

TREAT SEED POTATOES FOR DISEASE.

Recent investigations made at the Ohio Experiment Station show that a disease, heretofore but partially recognized, injures potato-tops severely at times. This is the potato rosette, and this disease appears to be general. Seed treatment in 1903 has increased the yield, where the disease prevailed, from 25 to 125 per cent on a light crop. Bulletin 145, just published, gives the second series of results in treating for this trouble. Formalin at the rate of 1 pint in 30 gallons of water is the solution used. Immerse the seed potatoes in this for 2 hours, after which the tubers may be dried and cut for planting. This bulletin will be sent to all citizens of the State who may apply for it. Address The Ohio Experiment Station, Wooster, O.

This treatment is also a remedy for scab. An increase of from 25 to 125 per cent makes it well worth while to treat the seed with formalin as above. Tomatoes are also sometimes affected with the same disease, and a similar one is found at times on Grand Rapids lettuce.

THE ROASTED-CHESTNUT POTATO.

We are exceedingly glad to get something from one of the old veterans in growing nice potatoes, and I can heartily indorse every point friend Manum makes. I think I shall have to send him a potato or two so that he can see what he can do.

Friend A. I. Root.—In GLEANINGS for Feb. 15 you ask if some one can advise you how to grow your "roasted-chestnut potato so they won't be hollow." Now, were I to try to breed out the hollowness in a potato I would try late planting say from June 25 to July 12. I have succeeded in growing fine potatoes from hollow seed by planting July 12 on an old strawberry-bed just turned over. My nicest potatoes the past year were grown by planting July 7. These were set aside for family use. Then if the season proves favorable for potato-growing when planting thus late we may expect a fair yield of fine table potatoes. What I call a favorable season is one with a moderate rainfall. Too much washing of the soil by frequent heavy rains is not what the potato requires, but, rather, the

moisture that may be brought within reach of the roots by capillary attraction. It is well known that plants take up their food only when it is provided in solution, taking it by absorption. The food may be dissolved, however, by water or by the direct action of the roots or by the process of fermentation, which is almost constant in all soils. In either case, soil moisture is essential. Now if our soil is of such a nature that we can obtain sufficient moisture by capillary attraction, it being that upon which plants mostly feed, as it travels upward, downward, and sidewise, we have the most natural conditions for plants to obtain food. Of course, free water (rain) is essential in moderate quantities to replenish the bottom strata, so that nature's "pumps" may have a supply from which to draw. Furthermore, I have observed that cool nights are beneficial to the development of the tubers; hence the desirability of late planting for quality.

I have barely touched on the subject of plant-growth, and doubtless unnecessarily as I am sure you are better posted on this subject than I am; but when I get to writing or talking on this subject I am much in the same predicament that I am when in an orange grove sampling the golden fruit. *I don't know when to stop.* And, by the way, friend Root, I have been much interested in your writings of Southern California, as my wife and I spent the winter in Los Angeles and vicinity last year.

A. E. MANUM.

Bristol, Vt., Feb. 22, 1904.

THAT HIGH-PRICED POTATO.

Below is the clipping from the *Scotsman*, referred to on page 243:

The new potato, El Dorado, was sold at the London Christmas Show at £150 for one pound weight, and the buyer was offered £160 for it later.

RAISING THE HARDY CATALPA FOR LUMBER, POSTS, HONEY, ETC.

We were recently shown by an agent some beautiful specimens of very light tough lumber from the hardy catalpa that grows native in some parts of the West. This catalpa is also said to be worth as much for posts, railroad-ties, and timber to be put in the ground, as any thing else known; and several railroad companies are planting the trees to grow ties. As I knew they had been considering the matter at our Ohio Experiment Station I asked Prof. W. J. Green to tell us something about the tree. Here is his reply:

Most seedsmen have been careless regarding the kind of seed which they sold, hence the majority of the trees which have been grown from these seeds are of the wrong kind, because the hardy catalpa does not produce as much seed, and is more difficult to procure. It is impossible, when the trees are small, to tell what they are. After they have attained some age it is possible then to distinguish the different kinds. They are easily distinguished by the blossoms and seed. The station is now making considerable effort to introduce the true hardy catalpa, and we have quite a number of trees which we expect to send out to different parts of the State for the sake of an experiment. We do not expect to sell the trees nor give them away, but we shall require the party to conduct an experiment to pay for the trees.

The catalpa frequently, on good soil, makes an increase in diameter of an inch a year. I saw trees in Creston a few days ago that were planted only ten years ago and one of them was more than a foot in diameter. On ordinary soil they would not grow as fast. There are some near Wooster that are about twenty years old, not very much larger than the one mentioned at Creston. We have some on the station ground that are ten to twelve feet high, three years from planting. I know of a grove where the trees are planted eight feet apart each way, and at twenty years of age are worth on an average \$1.00 per tree for posts and poles. I hope that you will plant a grove of this tree, for it is surely very valuable, and I do not know of any species of tree that will be likely to yield greater profit.

W. J. GREEN.

Wooster, O., Feb. 15.

THE SLOE PLUM IN EUROPE.

Mr. Green's letter on the sloe plum reminds me (as an Englishman) of the wild sloe of Great Britain, which is identical with the Irishman's black-thorn or shillala.

From the white-blossomed sloe

My dear Chloe I requested

A sprig her fair breast to adorn;

Oh! no, no! I replied;

May I perish if ever

I plant in that bosom a thorn. — *Irish Ballad.*

The wild British sloe is of the nature of a very small plum—purplish in color with the bloom of the Damson, and choky when eaten; grows freely and persistently in the stiff clay lands; the shoots emanating from the main stem are protected by the thorns, one on each side, which die when about a year old. The thorn forms a better fence than the hawthorn so extensively used while a patch of blackthorn brush is a pretty tough proposition to tackle. It is cut occasionally—that is, every fourth or fifth year, and furnishes "thorns" for mending the gaps in the hawthorn hedge-rows; and at such times those who wish can choose a very fine walking-stick by taking out part of the root for a handle.

The thorns spring up again from the old roots, and only occasionally from seed.

I should consider it a "plum," but of a low order; very hardy and parasite-resisting, ranking high in these respects, and I do not see why it would not be extremely useful for hybridizing work.

Melrose, Mass.

JAMES M. PULLEY.

From your description, friend P., I think the tree you refer to is very much like our sloe plum here, only I could hardly agree with you in regard to the quality; and with cultivation they get to be of pretty good size here. Not only should it prove useful for hybridizing, as you suggest, but why can it not be used for an extremely hardy root for grafting other more valuable plums? Can some of our nurserymen tell us about the latter?



MORE FROM HARRY LATHROP.

I have just read your comments on my letter, page 1019. I am glad of an opportunity to say a few words more.

I have not adhered to the natural-food plan for certain reasons. The principal is that, at the present time, one must isolate himself and provide his own food if he is away from home. We need association and good fellowship at our meals. This is very important. When I am at home I use a modified natural-food diet, and eat with the folks.

I believe the time will soon come when a great many people will adopt the plan of living on simple and natural foods. There must be a halt made soon. All over this country business men and clerks are overworking, and rushing themselves to the extent that they become so nervous that they can't take time for their meals or really to live. I am against our modern habits; but being right in the current it is difficult to change.

The fruit breakfast you speak of is all right. For an ordinary meal a slice of good graham bread and butter, a few English walnuts, and three or four best imported dried figs will give health and satisfaction. The expense of such living is very little, which is a consideration with many poor fellows. We have a great variety of good things to select from. All we require is to use only a limited number at a time, changing as our taste indicates our needs.

I shall stick to the natural foods as long as I can, other requirements considered.

I thank you for your kind words to me, Mr. Root, and pray that you may be spared in health and vigor for many years of useful work. HARRY LATHROP.

Monroe, Wis., Dec. 12.

NORTHROP KING & CO'S
HOG-PASTURE MIXTURE

WATCH US GROW FAT

P. Frandson, Crystal Lake, Ia., says: "I had 30 hogs on one acre all season. Couldn't begin to keep it down." Our Catalog tells.

TO HAVE YOU TRY THEM we will, for 14c (silver or stamps) send pictured catalogue and 9 packages of our **STERLING SEEDS**. **14c**

Field **GIANT 50-TON CARROT**, largest field carrot; enormous yield; high golden color (for butter); easily harvested.

OLD'S BLACK BEAUTY OAT, wonderful new variety from England; superior to white oats; yields enormously; very stiff, strong straw.

SPELTZ, yields double quantity of oats, wheat or barley, makes better feed; straw fine for fattening; ripens early; resists drought and frost; thrives on any soil.

CALIFORNIA WONDER BEAN, heaviest yielding bean ever known; one bean produced 156 pods, 1168 beans by actual count.

Garden **NEW TRIUMPH RADISH**, matures in 20 days, globe shape, striped horizontally with bright scarlet on pure white; a unique and striking novelty.

N & CO STERLING LETTUCE; beautiful crisp heading variety; rich golden center; never coarse; finest lettuce grown.

N & CO MINNESOTA RED GLOBE ONION, earliest, most perfect shape; finest color; no scullions; longest keeper; heaviest yield.

Flower **N & CO GIANT FANCY PANSY**, flowers extraordinarily large, exquisite colorings; a distinct and remarkable strain, greatly admired.

GOLDEN GLEAM SWEET PEAS, deep primrose yellow; large flowers, long stems, rare novelty.

CASH PRIZES for largest yields of **Peepo's Day Sweet Corn**. Earliest. Sweetest.

NORTHROP, KING & CO **STERLING SEEDS**
 Seedsmen, MINNEAPOLIS, MINN.



Vaughan's Twenty-Seventh Annual Catalogue

Covering the four Great Departments of Gardening
 Mailed **FREE** to all buyers of Garden Seeds, Flower Seeds, Greenhouse Plants, Shrubs and Hardy Plants. **WRITE NOW**
Vaughan's Seed-Store
 84-86 Randolph St., CHICAGO.
 14 Barclay St. NEW YORK.



DEATH TO BUGS

worms and all kinds of vegetable insect pests if you use our **Acme Powder Gun**. The simplest and most effective device for applying dry poison to Potatoes, Tobacco, etc. Works under as well as over, dusts every part of every leaf. Uses less because it wastes none. If your dealer don't have it send his name and \$1.00; we'll deliver charges paid. Write for Catalogue and Booklet. "The Acme of Potato Profit." Potato Empire Co., Box 20, Traverse City, Mich.



What Do You Think of This?

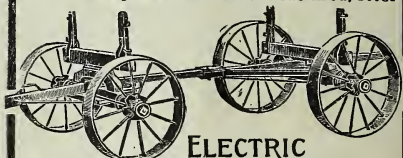
During the past year 15 farmers of Mesa County, Colo., have asked for our catalog about

Electric Steel Wheels and the Electric Handy Wagon

Up to date 14 of them have purchased either a wagon or a set of wheels.

Does that mean anything?

It proves that we have a **reasonable** proposition. We say that the Electric wide-tired, steel



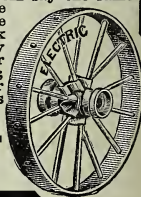
ELECTRIC

wheels will save you more labor and make you more money in a year than any other thing you could put upon the farm. Several hundred thousand farmers who have tried them say the same thing. By every test they prove to be the best. The spokes are united with hub solid, can't work loose. Your money back if they do. We don't ask you to take our word for it. Send for our book; read what others say and use your own judgment. Our catalogue is sent free for the asking.

Electric Wheel Co.

Box 95

Quincy, Illinois.



Farmers' Handy Wagon

With 4-Inch Tire Steel Wheels



\$21.95

Low and handy. Saves labor. Wide tires, avoid cutting farm into ruts. Will hold up any two-horse load. We also furnish steel wheels to fit any axle. Any size wheel, any width of tire. Catalogue free.

EMPIRE MANUFACTURING CO., Box 91, Quincy, Ill.

12 Pkts SEEDS THE BEST 20c

Beet, Egyptian; Cabbage, Sauerhead; Carrot, Danvers; Corn, Early Evergreen; Cucumber, Russian; L. tuce, Early Curled; Musk Melon, Paul Rose; Water Melon, Sweetheart; Onion, Prize Taker; Radish, Scarlet Turnip; Squash, Marrow; Tomato, Beauty. One packet each for 20 cts. coin or stamps, **FREE** with order, packet of **ESSEX RAPE**. Mention paper.

W. W. BARNARD & CO., 161 KINZIE ST., CHICAGO

Send Us Your Name and Address

for our catalog of Plants and 32 quart crate and quart baskets. Special prices for February and March.
 Address **H. H. AULTFATHER**, Minerva, Ohio.